C 21.5: 968/1

Vol. 968 Number 1

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

March 7, 1978

RECEIVED
MIAMI UNIVERSITY
LIBRARIES
MAR 24 1978
DEPOSITORY
DOCUMENTS DEPARTMENT

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

March 7, 1978 Volume 968 Number 1

CONTENTS

	Page
Patent and Trademark Notices	
Registration to Practice	968 OG 2
Reissue Applications Filed	968 OG 2
Patent Notices	
Certificates of Correction for the Week of March 7, 1978	968 OG 3
Disclaimers	968 OG 3
Disclaimer and Dedication	968 OG 3
Dedications	968 OG 3
Condition of Patent Applications	968 OG 4
Defensive Publications (T968,001)	1
Reissue Patents Granted (29,561)	3
Plant Patents Granted (4,218)	7
Patents Granted	
General and Mechanical (4,077,064)	9
Chemical (4,077,764)	245
Electrical (4,078,149)	351
Design Patents Granted (247,396)	391
Index of Patentees	PI 1
Indices of Applicants of Defensive Publications, Reissues, Plants and Designs	PI 42
Classification of	
Patents (Including Reissues)	PI 45
Designs, Plants and Defensive Publications	PI 47
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 48
Designs, Plants and Applicants of Defensive Publications	PI 49
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENTS SECTION), issued weekly, subscription $342.20 per annum for first class mailing, also available as fourth-class mail at $250.00; foreign mailing $85.55 additional; single copies $6.60 each.

THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly, subscription $88.40 per annum, foreign mailing $22.10 additional; single copies $1.70 each.

CIRCULARS OF GENERAL INFORMATION concerning PATENTS, price 60 cents each.

CIRCULARS OF GENERAL INFORMATION concerning TRADEMARKS, price 50 cents each.

PRINTED COPIES OF PATENTS are furnished by the Patent and Trademark Office at 50 cents each; PLANT PATENTS in color, $1.00 each; copies of TRADEMARKS AND DESIGN PATENTS at 20 cents each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Registration to Practice

The following are names of persons applying for registration to practice before the United States Patent and Trademark Office. Information tending to affect the eligibility of said applicants on moral, ethical, or other grounds, should be furnished the Commissioner of Patents and Trademarks on or before March 24, 1978.

Bailey, Craig B., 1201 S. Scott St., #731, Arlington, Va. 22204
Bozicevic, Karl, 1801 SW 11th Ct., #1, Fort Lauderdale, Fla. 33312
Borchelt, Archie R., 701 Fontaine St., Alexandria, Va. 22302
Carlson, Dale L., 7 E. 14th St., #21E, New York, N.Y. 10003
DelGiudice, Paul V., 4912 Taft Rd., Temple Hills, Md. 20031
Furois, Thomas J., 1401 W. 9th St., Space No. 134, Pomona, Calif. 91766
Glazer, Marvin A., 2052 E. Rice Dr., Tempe, Ariz. 85283
Heiffel, Roger W., 415 Madison Ave., New York, N.Y. 10017
Hellwege, James W., 2312 Sanford St., Alexandria, Va. 22303
Hodson, Hollis C., P.O. Box 114, Amo, Ind. 46103
Horn, John J., 32 Waverly Ave., #5, Lancaster, Pa. 17601
Lantner, Gary H., 48 Georgetown Rd., Boxford, Mass. 01921
Leon, Vivian L., P.O. Box 77343, Sta. C., Atlanta, Ga. 30357
Lin, Hung Chang, 8 Schindler Ct., Silver Spring, Md. 20903
Long, Brian M., 1203–71 Somerset St. W., Ottawa, Ontario K2G 2P2, Canada
McCuen, Charles M., 197 Nelson Rd., Scarsdale, N.Y. 10583
Meeker, Donald W., 34 Kent St., Scituate, Mass. 02066
Parmelee, Steven G., 6336 Jaynes St., Omaha, Nebr. 68104
Richardson, Thomas H. P., Raychem Corp., 300 Constitution Dr., Menlo Park, Calif. 94025
Schlitter, Stanley A., 2020 Lincoln Park W., Apt. 37D, Chicago, Ill. 60614
Schroeder, Robert R., 29 Wayne Terr., Apt. D, Cheektowaga, N.Y. 14225
Tedjeske, James J., RD #2, Box 614, Apollo, Pa. 15613
White, Travis G., 21510 Glenbranch, Spring, Tex. 77373
Wilhelm, Thomas D., 9442 County W., Larsen, Wis. 54947
Wing, Donald W., 2933 Madrona Dr., Longview, Wash. 98632
Witthaus, Terry A., R.R. 1, Box 35, Marthasville, Mo. 63357
Wyman, Daniel E., 1123 Caddington Ave., Silver Spring, Md. 20901

LUTRELLE F. PARKER,
Acting Commissioner of Patents and Trademarks and Chairman, Committee on Enrollment.

Feb. 6, 1978.

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

3,922,506, Re. S.N. 858,655, Filed Dec. 8, 1977, Cl. 179/175.1 A, ACOUSTICAL TESTING SYSTEM, George Joseph Frye, Owner of Record: *Inventor,* Attorney or Agent: Adrian J. LaRue, Ex. Gp.: 232

3,958,394, Re. S.N. 865,719, Filed Dec. 29, 1977, Cl. 53/112 A, CONTINUOUS MOVEMENT PACKAGING MACHINE, Reid A. Mahaffy, et al., Owner of Record: *Inventor,* Attorney or Agent: Howard M. Ballinger, et al., Ex. Gp.: 324

4,001,807, Re. S.N. 858,172, Filed Dec. 7, 1977, Cl. 340/324 A, CONCURRENT OVERVIEW AND DETAIL DISPLAY SYSTEM HAVING PROCESS CONTROL CAPABILITIES, Renzo Dallimonti, Owner of Record: *Honeywell Inc., Minneapolis, Minn.,* Attorney or Agent: Lawrence J. Marhoefer, Ex. Gp.: 234

4,021,617, Re. S.N. 865,715, Filed Dec. 29, 1977, Cl. 179/17 E, TELEPHONE RINGER ISOLATOR, Charles Elmer Jones Jr., et al., Owner of Record: *Bell Telephone Laboratories Incorporated, Murray Hill, N.J.,* Attorney or Agent: W. L. Keefauner, et al., Ex. Gp.: 232

PATENT NOTICES

Certificates of Correction for the Week of Mar. 7, 1978

Re. 28,951	4,033,411	4,051,250	4,055,763
Re. 29,466	4,034,226	4,051,327	4,055,788
Re. 29,475	4,035,015	4,051,362	4,055,961
3,862,950	4,035,496	4,051,394	4,056,041
3,897,956	4,036,560	4,051,419	4,056,211
3,919,787	4,038,713	4,051,434	4,056,317
3,920,620	4,038,912	4,051,496	4,056,621
3,920,726	4,038,945	4,051,684	4,056,741
3,932,037	4,039,041	4,051,746	4,056,781
3,938,635	4,041,478	4,051,896	4,057,524
3,943,136	4,041,762	4,051,906	4,057,639
3,944,610	4,041,783	4,052,416	4,057,800
3,950,326	4,042,457	4,052,480	4,057,880
3,953,499	4,042,573	4,052,530	4,057,917
3,956,178	4,042,609	4,052,605	4,058,187
3,957,986	4,042,857	4,052,707	4,058,203
3,969,390	4,044,649	4,052,789	4,058,296
3,976,603	4,044,963	4,052,819	4,058,372
3,983,604	4,045,201	4,053,044	4,058,574
3,987,072	4,045,209	4,053,100	4,058,637
3,993,614	4,045,465	4,053,164	4,058,648
3,993,686	4,046,658	4,053,234	4,058,769
3,998,065	4,046,914	4,053,251	4,058,812
3,999,909	4,047,564	4,053,339	4,059,469
4,001,095	4,048,056	4,053,431	4,059,565
4,002,470	4,048,231	4,053,596	4,059,593
4,005,744	4,048,283	4,053,656	4,059,858
4,005,902	4,048,434	4,053,885	4, 59,933
4,007,174	4,048,484	4,054,018	4,060,072
4,008,714	4,048,740	4,054,040	4,060,346
4,011,061	4,048,798	4,054,096	4,060,475
4,011,130	4,049,175	4,054,115	4,060,627
4,013,470	4,049,480	4,054,149	4,060,672
4,014,909	4,049,483	4,054,258	4,060,690
4,016,125	4,049,598	4,054,276	4,061,019
4,020,461	4,049,869	4,054,462	4,061,108
4,020,635	4,049,913	4,054,810	4,061,277
4,024,724	4,050,228	4,054,997	4,061,526
4,025,497	4,050,236	4,055,106	4,061,674
4,027,862	4,050,309	4,055,356	4,062,111
4,029,200	4,050,760	4,055,405	4,062,156
4,031,800	4,050,989	4,055,409	4,062,433
4,032,878	4,051,152	4,055,527	4,062,989
4,033,376	4,051,199	4,055,757	4,062,493

Disclaimer

3,894,118.—*Elihu J. Aronoff*, Framingham, *Kewal Singh Dhami*, Shrewsbury, and *Tsu-Chia Shieh*, Framingham. Mass. CROSSLINKING AGENTS FOR FLUOROCARBON POLYMERS. Patent dated July 8, 1975. Disclaimer filed Dec. 16, 1977, by the assignee, *International Telephone and Telegraph Corporation.*

Hereby enters this disclaimer to claim 11 of said patent.

Disclaimer and Dedication

3,990,787.—*Eugene F. Modert*, New London, Conn. SQUARE WAVE LIGHT GENERATOR. Patent dated Nov. 9, 1976. Disclaimer and dedication filed Dec. 19, 1977, by the assignee, *The United States of America as represented by the Secretary of the Navy.*

Hereby disclaims and dedicates to the Public all claims of said patent.

Dedications

3,821,628.—*William R. Caputo*, Wyckoff, N.J. ELEVATOR SYSTEM. Patent dated June 28, 1974. Dedication filed Nov. 14, 1977, by the assignee *Westinghouse Electric Corporation.*

Hereby dedicates to the Public the entire term of said patent.

3,841,911.—*James H. Henderlite III*, Charlotte, N.C. METHOD FOR REMOVING HEAT DEGRADABLE TEXTILE WASTE MATERIAL FROM APPARATUS USED IN TEXTILE OPERATIONS. Patent dated Oct. 15, 1974. Dedication filed Dec. 6, 1977, by the assignee, *Air Knife, Inc.*

Hereby dedicates to the Public the entire term of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF FEBRUARY 11, 1978

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	7-11-77
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	6-1-77
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	7-20-77
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-6-77
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	3-7-77
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	12-10-76
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	8-9-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	2-28-77
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	7-5-77
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	9-3-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	5-6-76
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-28-77
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-17-77
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	1-6-77
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	2-9-77
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors: Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	5-9-77

Expiration of patents: The patents within the range of numbers indicated below expire during February 1978, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 2,970,313 to 2,973,518, inclusive
Plant Patents ..... Numbers 2,019 to 2,031, inclusive

DEFENSIVE PUBLICATIONS

PUBLISHED MARCH 7, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O.G. 687. The abstracts of Defensive Publication applications are identified by distinctly numbered series and are arranged chronologically. The heading of each abstract indicates the number of pages of specification, including claims and sheets of drawings contained in the application as originally filed. The files of these applications are available to the public for inspection and reproduction may be purchased for 30 cents a sheet.

Defensive Publication applications have not been examined as to the merits of alleged invention. The Patent and Trademark Office makes no assertion as to the novelty of the disclosed subject matter.

T968,001
COAGULATION OF EPOXY ESTER-ACRYLIC EMULSIONS

John E. Poist, 27 MacArthur St., High Bridge, N.J. 08829

Filed Jan. 31, 1977, Ser. No. 764,325
Int. Cl.[2] C08F *33/02*
U.S. Cl. 260—23 EP
No Drawing. 20 Pages Specification

A coating coagulation bath is disclosed containing an emulsified graft copolymer of an epoxy ester and an alpha beta ethylenically unsaturated monomer. The bath itself is self-coagulatable in that a metal panel dipped into the bath will exhibit a coating on its surface immediately after removal.

T968,002
POLYURETHANE FOAM STABILIZED AGAINST SCORCH WITH A MIXTURE OF HYDROQUINONE AND A PHOSPHITE CONTAINING SECONDARY ANTIOXIDANT

William F. Baxter, Jr., 225 Windmere Pl.; Ted L. Douglas, Rte. 10, Blakely Dr., both of Kingsport, Tenn. 37664, and Gether Irick, 424 Meadow La., Kingsport, Tenn. 37663

Filed Feb. 24, 1977, Ser. No. 771,706
Int. Cl.[2] C08G *18/06;* C08K *5/13, 5/17, 5/52*
U.S. Cl. 260—2.5 BB
No Drawing. 11 Pages Specification

Polyurethane foams are stabilized against scorching when a mixture of hydroquinone and a phosphite containing secondary antioxidant is present in a foam-forming mixture of an organic polyisocyanate with a polyether polyol in the presence of a reaction catalyst and a foaming agent. The proportion of hydroquinone to the phosphite is in the range of 10:1 to about 1:1. Especially advantageous results can be obtained by adding p,p'-dialkylphenylamines containing between 3 and 18 carbon atoms in the alkyl moiety to the above two stabilizers. When the amine is present the stabilizer mixture usually comprises between about 15 and 90% by weight of the amine and the rest of the stabilizer comprises the hydroquinone and the phosphite in the range relative to each other as given above. The proportion of the stabilizer mixture is usually between about 10 and about 50,000 parts per million parts of the polyether polyol. The stabilizer mixture is preferably mixed with the polyol before using the polyol in making urethane foams.

REISSUES

MARCH 7, 1978

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 29,561
FUEL INJECTION SYSTEMS FOR INTERNAL COMBUSTION ENGINES

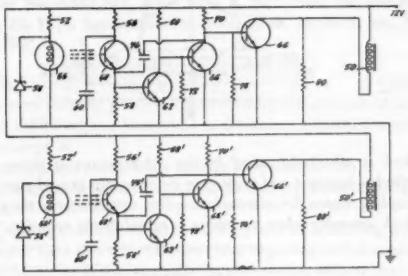
Eric H. Ford, London, England, assignor to Lumenition, Ltd., London, England

Original No. 3,851,628, dated Dec. 3, 1974, Ser. No. 874,470, Nov. 6, 1969. Application for reissue Nov. 26, 1976, Ser. No. 745,096

Claims priority, application United Kingdom, Nov. 12, 1968, 53580/68

Int. Cl.² F02M *51/00*

U.S. Cl. 123—32 EA **20 Claims**



9. An opto-electronic device for fast switching the solenoid of a fuel injector system of an internal combustion engine including a photo-transistor sensitive to infra-red radiation which will switch on or conduct when exposed to the radiation and switch off when the radiation is cut off; a solid state infra-red lamp; an element positioned between the solid state lamp and the photo-transistor and having one portion which is opaque to the radiation and another portion through which the radiation can pass; means for moving the element in timed relation to the engine revolutions; and a switching circuit interconnecting the solenoid and the photo-transistor including a plurality of transistors interconnected in a manner so that the output of one is connected to the input of the next and so as to switch on and off in inverse relation to one another, the first of the transistors being connected to the output of the photo-transistor and the last of the transistors being connected to the solenoid whereby the transistors, in response to switching of the photo-transistor, switch between on and off conditions and cause alternate energization and de-energization of the solenoid to thereby inject the desired quantity of fuel into a cylinder of the internal combustion engine.

Re. 29,562
METHOD AND APPARATUS FOR TESTING WELLS

Gary Q. Wray, Duncan, Okla., and George E. Petty, Ventura, Calif., assignors to Halliburton Company, Duncan, Okla.

Original No. 3,664,415, dated May 23, 1972, Ser. No. 71,695, Sep. 14, 1970. Application for reissue Apr. 22, 1976, Ser. No. 679,256

Int. Cl.² E21B *27/00*

U.S. Cl. 166—.5 **28 Claims**

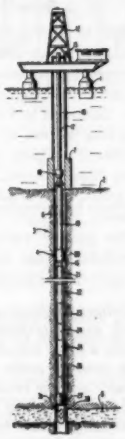
29. A method of testing a submerged formation intersected by a well bore having a lower portion extending from the sea floor to the formation to be tested and an upper well bore portion extending from the sea floor to a work station at the surface of the sea, said method comprising:

maintaining pressure in a body of fluid in said well bore, disposed in an annulus of said well bore external of a conduit means and adjacent a casing lining the lower portion of said well bore, at one level while maintaining said body of fluid isolated from said submerged formation to be tested, the interior of said conduit means and said upper well bore portion;

in response to said one level of pressure in said body of fluid, maintaining a flow path leading from said formation through said conduit means in said well bore in a closed condition;

changing the pressure of said fluid body while isolating said change in pressure of said fluid body from said formation, the flow path through said conduit means and said upper well bore portion;

in response to said change in pressure, permitting fluid to flow from said formation through said conduit means;



further changing the pressure of fluid in said fluid body while isolating said further change in pressure from said formation, the flow path through said conduit means and said upper well bore portion;

in response to said further change of pressure of said fluid body and independent of the pressure in the flow path through said conduit means, entrapping between upper and lower valve means within said conduit means located in said well bore adjacent said fluid filled annulus, a sample of fluid from said formation.

Re. 29,563
FUNCTIONAL ALLOY FOR USE IN AUTOMATED SOLDERING PROCESSES

Howard H. Manko, Teaneck, N.J., assignor to Alpha Metals, Inc., Jersey City, N.J.

Original No. 3,945,556, dated Mar. 23, 1976, Ser. No. 552,808, Feb. 25, 1975. Application for reissue Jan. 10, 1977, Ser. No. 757,873

Int. Cl.² C22C *13/00*

U.S. Cl. 228—263 **2 Claims**

6. In the process of machine soldering a workpiece by application thereto of a liquid solder from a molten reservoir, the improvement wherein said solder is an alloy consisting essentially of approximately 55% by weight tin, 2.77% by weight antimony, the remainder being substantially lead.

Re. 29,564

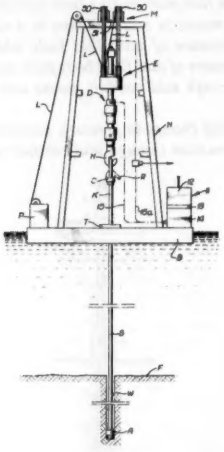
HYDRAULIC MOTION COMPENSATING APPARATUS

Edward Larralde, Santa Barbara, and Glen Robinson, Oak View, both of Calif., assignors to Vetco Offshore Industries, Inc., Ventura, Calif.

Original No. 3,841,607, dated Oct. 15, 1974, Ser. No. 274,880, Jul. 25, 1972. Application for reissue Sep. 2, 1975, Ser. No. 609,367

Int. Cl.[2] B66D *1/48*

U.S. Cl. 254—172 **25 Claims**



25. On a floating drilling platform of the type having a derrick, an upper crown block assembly having a plurality of sheaves mounted on the derrick, a lower travelling block assembly having a plurality of sheaves, powered cable means interconnecting the travelling block assembly and the crown block assembly, a rotary carrier for supporting the drill string below the travelling block, and a hydraulic heave compensator between the travelling block assembly and the rotary carrier; said crown block being formed with a vertical opening passing between said sheaves and said heave compensator comprising a central cylinder mounted on the travelling block assembly and arranged to pass through said vertical opening while the travelling block is selectively raised by the cable means, a piston in said cylinder having a rod projecting downwardly to said carrier, and coupling means for selectively coupling said carrier to the travelling block assembly when the piston is raised in the cylinder.

Re. 29,565

DRILL STRING HEAVE COMPENSATOR AND LATCHING APPARATUS

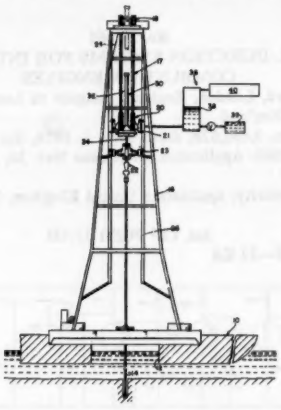
Royal T. Hawley, Everett, Wash., and Richard S. Hollyer, Houston, Tex., assignors to Western Gear Corporation, Everett, Wash.

Original No. 3,834,672, dated Sep. 10, 1974, Ser. No. 355,553, Apr. 30, 1973. Application for reissue Oct. 14, 1975, Ser. No. 621,750

Int. Cl.[2] B66D *1/48*

U.S. Cl. 254—172 **2 Claims**

9. For use on a floating drilling platform of the type having a derrick, apparatus comprising: an upper crown block assembly adapted to be mounted on the derrick, said crown block assembly including sets of primary sheaves located at opposite sides of a vertical opening through the crown block assembly and including a transition sheave, a lower traveling block assembly including sets of secondary sheaves, said primary sets of sheaves lying in parallel planes and being coplanar with said secondary sheaves, and said transition sheave being directly between and at right angles to said primary sheaves, the traveling block assembly and the crown block assembly being adapted to be interconnected by powered cable means, a rotary carrier for supporting the drill string below the traveling block, and a hydraulic heave compensator between the traveling block assembly and the rotary carrier comprising a central cylinder mounted on the traveling block assembly and arranged to pass through said vertical opening while the traveling



block is selectively raised by the cable means, a piston in said cylinder having a rod projecting downwardly to said carrier, and coupling means for selectively coupling said carrier to the traveling block assembly when the piston is raised in the cylinder.

Re. 29,566

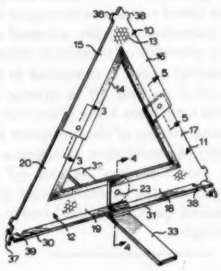
FOLDABLE EMERGENCY REFLECTING DEVICE

Peter E. Brudy, West Hill, Canada, assignor to Dominion Auto Accessories Limited, Toronto, Canada

Original No. 3,806,234, dated Apr. 23, 1974, Ser. No. 297,630, Oct. 16, 1972. Application for reissue Jul. 21, 1976, Ser. No. 707,223

Int. Cl.[2] G02B *5/12*

U.S. Cl. 350—97 **7 Claims**



22. In a foldable emergency reflecting device, the combination comprising

three members having reflective media thereon,

each member comprising a pair of arms rigidly connected to one another and extending at an acute angle to one another,

means pivotally interconnecting the end of the arm of one of said members with the end of the one arm of a second member,

means pivotally interconnecting the end of the other arm of the second member to one arm of the third member,

and means releasably interconnecting the other arm of the third member to the other arm of the first member to provide a generally triangular construction such that when said means releasably interconnecting is disconnected, the members may be swung relative to one another to produce a compact folded construction,

said means pivotally interconnecting the end of the arm of one of said members with the end of the arm of a second member comprising a bracket fixed on said one arm of said one of said members and transverse pin means pivoting said arm of said second member to said bracket and said one arm of said one member,

a base provided for the reflecting device including flat legs pivoted to one another by a pin on said bracket,

at least some of said legs being foldable between a position overlying one another adjacent said bracket and the arm of one of said members to a position generally at a right angle to the plane of said members.

Re. 29,567

METHOD OF REFINING STEEL

Crawford B. Murton, 1906 Brushcliff Rd., Pittsburgh, Pa. 15221

Original No. 3,881,917, dated May 6, 1975, Ser. No. 435,093, Jan. 21, 1974. Application for reissue Feb. 24, 1977, Ser. No. 771,782

Int. Cl.[2] C21C *7/00;* **C22B** *9/10*

U.S. Cl. 75—52 **9 Claims**

1. A steel refining process for facilitating the solution of solid lime by inhibiting the formation of dicalcium silicate, comprising the steps of

a. heating and oxidizing a molten iron-base metal,

b. adding solid burnt lime to the molten iron-base metal [,] and

c. [adding material of high basicity and of a melting point lower than that of solid burnt lime together with a mixture of fluorspar and oxides of iron, manganese, silicon, magnesium, and calcium, which oxides have melting points of from about 2,000° to 2,800° F, to provide a slag devoid of encapsulated solid bodies of burnt lime] *adding fluorspar and slag conditioners of high basicity and of melting points lower than that of solid burnt lime which slag conditioners comprise oxides of iron, manganese, silicon, magnesium, and calcium, and which slag conditioners have melting points of from about 2000° to 2800° F, to provide a slag devoid of dicalcium silicate encapsulated solid bodies of burnt lime and fluorspar.*

Re. 29,568

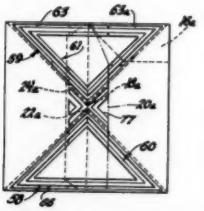
CARTON SEALING APPARATUS

Eric A. Braun, Springfield, Mo., assignor to Ex-Cell-O Corporation, Troy, Mich.

Original No. 3,912,576, dated Oct. 14, 1975, Ser. No. 516,949, Oct. 22, 1974. Application for reissue Feb. 16, 1977, Ser. No. 769,251

Int. Cl.[2] B31B *31/00;* **E04B** *2/00*

U.S. Cl. 156—580.2 **10 Claims**



1. A carton sealing vibrating tool for ultrasonically sealing an end closure of a thermoplastic coated paperboard carton comprising: a body having an end surface with a ribbed formation projecting therefrom, said ribbed formation including a pair of oppositely disposed sets of concentric triangular enclosures.

Re. 29,569

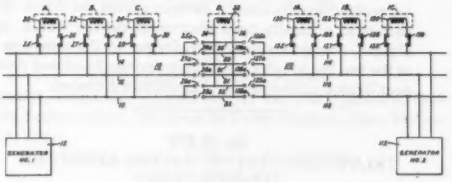
SPARE TRANSFORMER CONNECTING MEANS

Nathan Swerdlow, Philadelphia, Pa., assignor to General Electric Company, Philadelphia, Pa.

Original No. 3,519,838, dated Jul. 7, 1970, Ser. No. 794,049, Jan. 27, 1969. Continuation of Ser. No. 440,924, Feb. 8, 1974. Application for reissue Aug. 6, 1975, Ser. No. 602,354

Int. Cl.[2] H02J *3/00*

U.S. Cl. 307—17 **13 Claims**



5. [The combination as defined in claim 1 in further combination with:] *In an electric power system that comprises: (1) a three-phase isolated phase bus comprising first, second, and third main bus bars, (2) three single-phase transformers each having a primary winding with a pair of terminals, (3) a pair of normally-closed disconnect devices for each of said primary windings connecting said three primary windings in delta to said bus, the normally-closed disconnect devices of each pair being between the terminals of the associated primary winding and the main bus bars to which said terminals are respectively connected and (4) a spare transformer having a primary winding with a pair of terminals; means for connecting said spare transformer to said bus as a replacement for any one of said three single-phase trasnsformers, comprising:*

(a) first and second auxiliary bus bars, respectively connected to the opposite terminals of the primary winding of said spare transformer,

(b) three normally-open disconnect devices, the first being electrically connected between the first of said main bus bars and said first auxiliary bus bar, the second being electrically connected between the second of said main bus bars and said first auxiliary bus bar, and the third being electrically connected between the third of said main bus bars and said first auxiliary bus bar,

(c) three additional normally-open disconnect devices, the first additional normally-open disconnect device being electrically connected between the first of said main bus bars and said second auxiliary bus bar, the second additional normally-open disconnect device being electrically between the second of said main bus bars and said second auxiliary bus bar, the third additional normally-open disconnect device being electrically between the third of said main bus bars and said second auxiliary bus bar,

(d) replacement of any one of said single phase transformers by said spare being effected by opening the two normally-closed disconnect devices connecting said one single phase transformer to a given pair of main bus bars and closing the two normally-open disconnect devices that, upon closing, connect the spare to said given pair of main bus bars, and

(e) interlock means requiring (i) opening of the normally-closed disconnect device connected between a given one of said main bus bars and the terminal connected thereto of the single phase transformer that is being replaced, as a requisite to (ii) the closing of the normally-open disconnect device located between said given bus bar and the corresponding polarity terminal of the spare transformer connected thereto upon said closing, and in further combination with the above-recited combination:

[(a)] *(f)* a plurality of metal housings at ground potential respectively surrounding each of said main bus bars,

[(b)] *(g)* the metal housing surrounding a given bus bar also having a portion surrounding the disconnect devices connected thereto,

[(c)] *(h)* access openings in said housings respectively located opposite the disconnect devices therein,

[(d)] *(i)* covers for each of said access openings,

[(e)] *(j)* locks for each of said covers normally locking said cover on its associated opening,

[(f)] *(k)* a key for each of the locks of a cover opposite a normally-closed disconnect device,

[(g)] *(l)* key interlock means preventing the key used for unlocking a cover opposite a given normally-closed disconnect device from unlocking any of the covers of said normally-open disconnect devices except the cover of the particular normally-open disconnect device which, upon closing, connects a spare transformer to the same bus bar as the bus bar to which said given normally-closed disconnect device connected its transformer terminal.

Re. 29,570

TELEVISION SYSTEM HAVING APERTURE CORRECTION

Hendrik Breimer, and Sing Long Tan, both of Eindhoven, Netherlands, assignors to U.S. Phillips Corporation, New York, N.Y.

Original No. 3,732,360, dated May 8, 1973, Ser. No. 226,432, Feb. 15, 1972. Continuation of Ser. No. 624,944, Mar. 21, 1967, abandoned. Application for reissue Sep. 16, 1976, Ser. No. 723,742

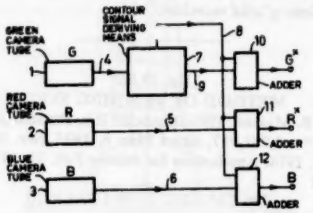
Claims priority, application Netherlands, Mar. 26, 1966, 6604020

Int. Cl.[2] H04N *9/535*

U.S. Cl. 358—37 **11 Claims**

1. A color television system comprising means for producing potential images corresponding to each of three color components of an optical image and converting said potential images into color component signals, means to derive a delayed signal from one of said color component signals by comparing the color component signal with itself at substantially adjacent points of the potential image to thereby obtain a contour signal associated with said color component signal, and means for adding said delayed signal to all of said color component signals to sharpen transitions therein.

7. A color television system comprising means for producing potential images corresponding to each of three color components



of an optical image and converting said potential images into color component signals, means to derive delayed horizontal and vertical signals from only one of said color component signals by comparing said one color component signal with itself at substantially adjacent points of the potential image to thereby obtain a contour signal associated with only said one component signal, and means for adding said contour signal to an output signal which included all of said color component signals to sharpen image transitions therein.

PLANT PATENTS

GRANTED MARCH 7, 1978

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

4,218

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Mar. 17, 1977, Ser. No. 778,667
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—77 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium* Ramat., plant known by the cultivar name Splash and particularly characterized as to uniqueness by the combined characteristics of flat capitulum form, reflexing slightly at full maturity; spider capitulum type; ivory white ray floret color; diameter across face of capitulum ranging from 100 to 115 mm. at maturity; uniform 10 week photoperiodic flowering response to short days; tall plant height when grown as a single stem cut spray; and semi-upright branching pattern.

4,219

POINSETTIA PLANT

Alexander Hrebenink, Perkasie, Pa., assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Mar. 24, 1977, Ser. No. 780,983
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—86 **1 Claim**

1. A new and distinct cultivar of poinsettia plant characterized particularly as to novelty by the combined characteristics of upright growth with vigorous self branching in all seasons, from the base to the terminal tip of the plant, and the complete flowering of each shoot; uniform flowering response from bottom to top; excellent keeping qualities; cream white bract color; fast and uniform rooting from an abundance of cuttings from each plant; self branching initiated at fully developed nodes 4"-5" above the soil line in 4" pots, with six to eight mature leaves, a unique characteristic, and the characteristic of controlling top growth and side bracts by properly managing side growth and primary foliage.

4,220

CHRYSANTHEMUM PLANT

Walter H. Jessel, Jr., Grantsville, W. Va., and William E. Duffett, Salinas, Calif., assignors to Yoder Brothers, Inc., Barberton, Ohio

Filed Mar. 24, 1977, Ser. No. 780,984
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—74 **1 Claim**

1. A new and distinct cultivar of *Chrysanthemum morifolium* Ramat, known by the cultivar name Yellow Frost and particularly characterized as to uniqueness by the combined characteristics of spoon daisy capitulum type; flat capitulum form; medium yellow ray floret color; yellow green (immature) to yellow (mature) disc floret color; diameter across face of capitulum from 80 to 95 mm. at maturity; uniform nine week flowering response to photoperiodic short-day control; medium plant height; semi-spreading branching pattern; and minimal pollen development.

4,221

POINSETTIA PLANT

Alexander Hrebeniuk, Perkasie, Pa., assignor to Mikkelsens, Inc., Ashtabula, Ohio

Filed Mar. 24, 1977, Ser. No. 780,985
Int. Cl.[2] A01H *5/00*

U.S. Cl. Plt.—86 **1 Claim**

1. A new and distinct cultivar of poinsettia plant particularly characterized as to novelty by the combined characteristics of heavy thick leaves, stiff thick stems and appearance of cyathias all of which tend to indicate that the cultivar is a tetraploid; self branching from the base of the stem without removal of terminal tips; deep, bright red bract color; fast rooting in both summer and winter and excellent cutting production; long lasting bracts and foliage, and relatively large total bract head.

PATENTS

GRANTED MARCH 7, 1978

ERRATA

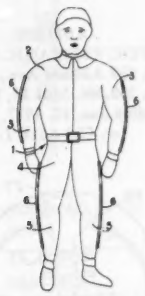
For CLASS	See PATENT NO.
063-031	4,077,237
101-093.05	4,077,336
366-102	4,077,612
366-213	4,077,613
267-166	4,077,619
277-092	4,077,634
062-048	4,077,288
062-054	4,077,789
159-047 R	4,077,841
195-063	4,077,842
427-120	4,078,111
427-444	4,078,112
362-122	4,078,169
362-322	4,078,170
324-071 CP	4,078,211
325-421	4,078,212
325-459	4,078,213
365-107	4,078,229
365-008	4,078,230
363-096	4,078,247

PATENTS

GRANTED MARCH 7, 1978

GENERAL AND MECHANICAL

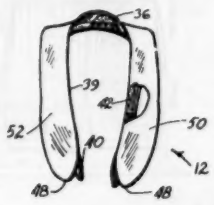
4,077,064
JUMPING SUIT FOR A PARACHUTIST
René Louis Maidon, Clichy, France, assignor to Etudes et Fabrications Aeronautiques, France
Continuation of Ser. No. 572,090, Apr. 28, 1975, abandoned.
This application Dec. 15, 1976, Ser. No. 750,694
Claims priority, application France, Apr. 30, 1974, 74 15089
Int. Cl.[2] A62B *17/00*
U.S. Cl. 2—2.1 R **12 Claims**



1. In a sky-diving suit of the type to be worn loosely by the parachutist in an aircraft and therefore devoid of pressurizing means for high altitudes having a flexible wall defining sleeves and trousers for a parachutist for use in competition or sport for effecting relative work in a group of parachutists while falling freely from an aircraft; the improvement comprising in combination means for facilitating the taking hold of and the gripping of the wall of the suit when sky-diving by the hand of another parachutist in the course of diving, said gripping means consisting of elongated elements and means combining each of the elongated elements with and fixing the elongated element to the wall of the suit so as to constitute an elongated seizable projecting structure which is coextensive with and adjoins the outside of the wall of the suit in a continuous manner throughout the length of the element so that gaps and cavities in and projections on the structure liable to accidentally hook onto objects are avoided, the elongated elements being discrete and independent of each other and extending on a part of the length of the sleeves and trousers of the suit solely on the outside of the arms and legs of the parachutist, the parts of the wall defining the sleeves and trousers being of the type which loosely surround the legs and arms of the parachutist in use at least in the aircraft before sky-diving.

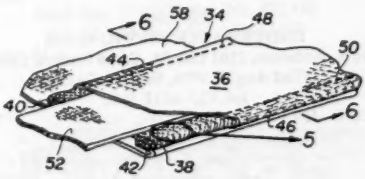
4,077,065
BODY GARMENT
Gerald E. Wactor, 884 Harned St., Perth Amboy, N.J. 08861
Filed Jul. 1, 1976, Ser. No. 701,539
Int. Cl.[2] A41D *1/00*
U.S. Cl. 2—93 **1 Claim**

1. A body garment system usable with trousers and capable of combined use as a suit, a tuxedo, and a non-matched sport outfit, comprising, in combination: at least one jacket having a lapel-receiving portion; at least one vest having a lapel-receiving portion; at least one reversible lapel formed with a first pattern on one side thereof and a second pattern on the opposite side thereof, said reversible lapel comprising means for cooperatively mounting said lapel on either of said vest lapel-receiving or said jacket lapel-receiving portions with either of said first or second patterns exhibited; said body garment system comprising a non-vested suit when comprising said trousers, said jacket and said jacket-mounted lapel all exhibiting a common pattern; said body garment system comprising a vested suit when comprising said trousers plus said jacket plus said vest plus said vest-mounted lapel all exhibiting a common pattern; said body garment system comprising a tuxedo when comprising said trousers plus said jacket plus said vest plus said vest-mounted lapel with said lapel exhibiting a satin pattern; said body garment system comprising a non-jacket sport outfit when comprising said trousers plus said vest plus said vest-



mounted lapel; said body garment system comprising a non-vested jacketed sport outfit when comprising said trousers plus said jacket plus said jacket-mounted lapel all exhibiting complimentary but an uncommon pattern; and said body garment system comprising a vested jacketed sport outfit when comprising said trousers plus said vest plus said jacket plus said vest-mounted lapel all exhibiting complimentary but an uncommon pattern.

4,077,066
WASH-AND-WEAR GARMENT PLACKET, COLLAR AND CUFFS
George Weiss, 520 Magnolia Blvd., Long Beach, N.Y. 11561
Filed Mar. 18, 1977, Ser. No. 779,266
Int. Cl.[2] A41B *3/00*
U.S. Cl. 2—129 **12 Claims**



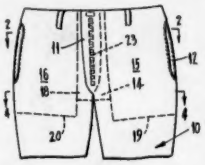
1. An improved multi-ply construction for finishing an edge of a garment, said construction being of the type fabricated of at least one outer fabric ply and having an inner bias-oriented woven interliner ply for providing shape and body thereto, said aforesaid plies of said construction being attached together in superposed relation by stitching deposited therethrough, said improvement contributing to the minimal stitch pucker and the like in said construction comprising, in cooperating combination with said bias-oriented woven interliner ply, of an additional control ply fabricated of non-stretch material having peripheral edges bounding a selected shape and sized so that said peripheral edges thereof are in adjacent positions spaced inwardly of corresponding peripheral edges of said bias-oriented woven interliner ply, and securing means for attaching said control ply in said aforesaid location to said interliner ply, whereby said woven interliner ply yarns immediately adjacent said control ply are adapted to undergo opening movement against the resistance of said non-stretch control ply during the application of said stitching and subsequent

corresponding closing moving in response to said resistance to thereby minimize tension in said stitching.

4,077,067
TROUSER GARMENTS

Emil Kozdal, 11 Rotherwood Rd., Ivanhoe, Victoria, Australia (3079)

Filed Aug. 19, 1976, Ser. No. 715,997
Int. Cl.² A41D *1/06*
U.S. Cl. 2—234 **1 Claim**

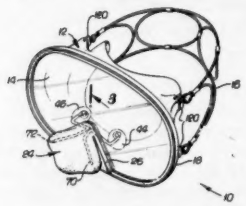


1. A trouser garment comprising a pair of rear leg portions united to form a crotch and rear seam; a pair of front leg portions each joined at one side to one of said rear leg portions to form a pair of side seams, said fron leg portions each including a folded portion opposite the associated side seam, said folded portions being shaped to overlie each other to form a fly, the outermost one of said folded portions including an adhesive material on its internal surfaces for fixing said outermost folded portion when pressure is applied thereto to avoid exposed stitching; means for controllably joining said folded portions together, and a pair of flap portions behind said front leg portions, each of said flap portions extending between and joined to one of said side seams and the folded portion of one of said front leg portions, said flap portions being joined to inner lining pieces between said flap portions and said front leg portions to form pockets independently of said front leg portions whereby stretching of the front leg portions associated with the wearing of the garment tending to cause wrinkles is substantially avoided.

4,077,068
UNDERWATER DIVING MASK

Richard E. Anderson, 2102 Oak St., Santa Monica, Calif. 90405

Filed Aug. 9, 1976, Ser. No. 713,136
Int. Cl.² A61F *9/02*
U.S. Cl. 2—428 **7 Claims**

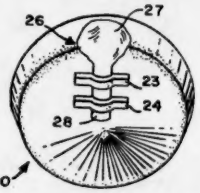


1. In a mask for underwater divers:
(a) a mask including a face plate and a body having a flange adapted to fit the face of the wearer;
(b) a pair of pads adapted to engage the fibro-areolar tissue on opposite sides of the diver's nose;
(c) a pair of levers or pivot rods for the pads respectively;
(d) means mounting the pivot rods on the mask for angular movement about adjacent axes extending substantially perpendicular to the face plate and at about the area of the top of the pyriform nose bone aperture;
(e) said pivot rods having inner ends mounting said pads and having outer ends accessible frontally of the mask plate;
(f) the outer ends of said pivot rods forming normally downwardly diverging handles positioned to be squeezed between the thumb and forefinger of the user to cause angular movement of the pivot rods and movement of said pads from an upward retracted position to a downward tissue engaging position; and
(g) means spring biasing said handles and said pads to retracted position.

4,077,069
SYNTHETIC TYMPANIC MEMBRANE

Rodney C. Perkins, 935 Addison Ave., Palo Alto, Calif. 94301

Division of Ser. No. 359,346, May 11, 1973, Pat. No. 4,014,971.
This application Jan. 14, 1977, Ser. No. 759,344
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1 **9 Claims**



1. A synthetic tympanic membrane for use as a substitute for a natural tympanic membrane in a host, comprising:
a conically shaped first wall, said first wall corresponding in size and shape to a natural tympanic membrane; and
cylindrically shaped second wall extending from said first wall, both said first and said second wall being formed and made of a material compatible with the tissue of the host for providing a scaffolding to support on-growth of tissue from the host.

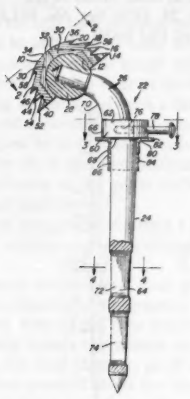
4,077,070
ARTIFICIAL HIP JOINT

Konstantin Mitrofanovich Sivash, ulitsa Bolshaya Pirogovskaya, 37/43-A, kv. 49, Moscow, U.S.S.R.

Division of Ser. No. 414,431, Nov. 9, 1973, Pat. No. 3,943,576, which is a division of Ser. No. 189,261, Oct. 14, 1971, Pat. No. 3,820,167, which is a continuation-in-part of Ser. No. 737,910, Jun. 18, 1968, abandoned. This application Aug. 19, 1975, Ser. No. 605,822
The portion of the term of this patent subsequent to Jun. 28, 1991, has been disclaimed.
Int. Cl.² A61F *1/24*
U.S. Cl. 3—1.912 **6 Claims**

1. An artificial hip joint comprising: an acetabulum prosthesis of the cotyloid cavity defining a chamber and including an insert positioned within the chamber for forming a socket; means for holding the insert in place in the chamber defined by the acetabulum prosthesis; and a prosthesis of the head of the femur movably interconnected with said acetabulum prosthesis and including a pin to be driven into the bone-marrow channel of the femur, a neck integral with the pin, and a hip

ball fixedly positioned on the neck and movably mounted within said socket, the socket enveloping more than one-half of



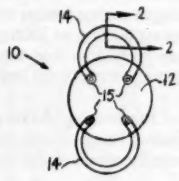
the hip ball to prevent withdrawal of the hip ball from the socket.

4,077,071

NEUTRAL BUOYANCY INTRAOCULAR LENS DEVICE

Jerre M. Freeman, Ste. 405, Doctors Bldg. Methodist Hospital, 188 S. Bellevue, Memphis, Tenn. 38104

Filed Mar. 15, 1976, Ser. No. 666,651
Int. Cl.[2] A61F *1/16, 1/24*
U.S. Cl. 3—13 **9 Claims**



1. An intraocular lens device for implantation into a human eye, said lens device comprising:

(a) an optical lens suitable for replacing a human crystalline lens having a mean density greater than that of the aqueous humor of said human eye; and

(b) buoyancy means external of and attached to said optical lens having a mean density less than the density of said aqueous humor for providing a plurality of irido-capsular support points on the posterior surface of the iris of said human eye to hold said optical lens in place when implanted into said human eye and for reducing the overall mean density of said lens device to substantially that of said aqueous humor.

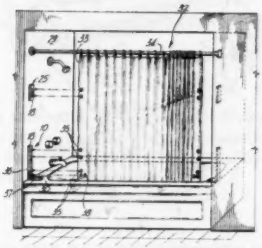
4,077,072

SHOWER BATH CURTAIN HOLDER

Waldo Dezura, 235 Keith Rd., West, Apt. 601, Vancouver, B. C., Canada

Filed Jul. 19, 1976, Ser. No. 706,286
Int. Cl.[2] A47K *3/14, 3/22*
U.S. Cl. 4—149 **6 Claims**

1. A device for preventing water escape from a shower by releaseably securing at least one end of a shower curtain to a wall of a bath tub compartment, said device being of the type utilizing releasably interlocking fiber tab means having a first part and a second part, said first part being arranged to be secured to the curtain; said device comprising holder means for securing to said wall said second part of the tab means; said holder means including an elongated, generally flat, flexible holder member having a top surface provided with at least a portion of said second tab means; said holder member having a base surface provided with means for adhesively securing said base surface to said wall; said base surface having a first section arranged to be secured to said wall along a generally upright



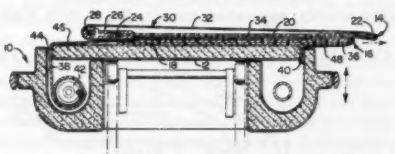
line; a second section arranged to become secured to the rim of the bath tub in a generally horizontal position, in proximity to said generally upright line; and a third section integral with said first section and with said second section, said third section being located between said first section and said second section and being arranged to become secured to a corner portion defined by said wall and by said rim near said generally upright line and said third section further including weakening means whereby flexibility of said third section is increased.

4,077,073

SEPARATOR ASSEMBLY FOR TRANSFER MECHANISMS

Laurel A. Koll, Ruleville, Miss., and Noel Depew, Wichita, Kans., assignors to Mobilizer Medical Products, Inc., Summit, N.J.

Filed Jun. 17, 1976, Ser. No. 697,156
Int. Cl.[2] A47B *83/04;* A61G *1/02*
U.S. Cl. 5—81 R **15 Claims**



1. A separator assembly for patient transfer mechanisms comprising:

a thin, flexible separator plate having front and rear edges;

a retainer bar having front and rear edges and disposed along the rear edge of said separator plate, said retainer bar having forwardly extending flange portions to define a slot opening in the front edge thereof and to receive the rear edge of said separator plate;

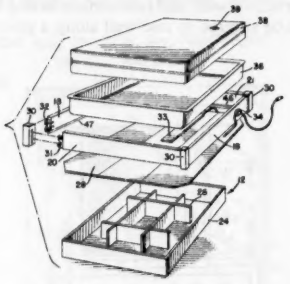
a drive roller located along the rear edge of said retainer bar;

means rotatably supporting said drive roller from the rear edge of said retainer bar at points spaced along the length of said drive roller and of said retainer bar;

an endless belt trained about said drive, roller said retainer bar and the front edge of said separator plate; and

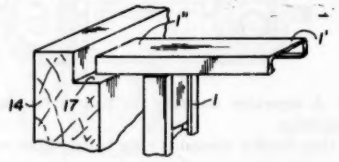
means for adjusting the distance between the front edge of said separator and said drive roller thereby to adjust the tension in said endless belt.

4,077,074
WATERBED FRAME CONSTRUCTION
Isaac Fogel, 2428 Eastgate Rd., Silver Spring, Md. 20906
Filed Nov. 17, 1976, Ser. No. 742,620
Int. Cl.[2] A47C *27/08*
U.S. Cl. 5—370 9 Claims



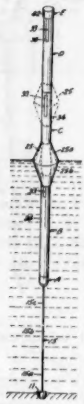
1. A bed, said bed comprising:
a water impermeable mattress adapted to be filled with water,
a waterproof liner encompassing said mattress on four sides and the bottom thereof,
a frame surrounding said liner, said frame comprising a first pair of rail elements, a second pair of rail elements and four corner posts, each corner post containing pins,
slotted plates terminating the ends of each of the rail elements whereby the slotted plates engage said pins,
a deck supporting said liner, said deck having opposite ends attached to a first pair of said rail elements, said deck supporting said frame, said frame surrounding said deck, and
a pedestal supporting said deck, whereby said pedestal provides the sole support for said deck, said frame, said liner, and said mattress.

4,077,075
HONEYCOMB FRAME FOR BEE-HIVE
Georg Schade, Borsegasse 1, Vienna, Austria (A-1010)
Filed Jul. 6, 1976, Ser. No. 702,625
Claims priority, application Austria, Jul. 9, 1975, 5284/75
Int. Cl.[2] A01K *47/02*
U.S. Cl. 6—10 5 Claims



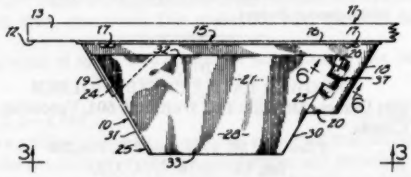
1. A honeycomb frame for a beehive, comprised solely of frame-forming elements of C-profile, the C-profile being defined by two legs projecting inwardly from the frame and two flanges projecting from the legs towards each other, respective ones of the frame-forming elements having abutting ends, coupling members connecting the abutting ends, the coupling members being shaped for sliding into the C-profile of the frame-forming elements and for frictional engagement therewith, and honeycomb fastening elements projecting inwardly from the frame and slidably mounted in the C-profile of at least one of said frame-forming elements.

4,077,076
ANCHOR LIGHT
John L. Masters, R.R. 1, Iron, Minn. 55751
Filed Apr. 28, 1976, Ser. No. 681,061
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8.3 E 12 Claims



1. A device comprising;
a buoyant housing,
a light bulb supported by said housing,
and means supported by said housing for turning said light on and off,
said housing comprising a plurality of tubular sections having disconnectible telescopically engageable portions for connecting said sections in end to end relationship,
said housing including an anchor section comprising one end of said device and supporting an anchor, said light bulb, and battery means housed in said tubular sections for illuminating at least a portion of the interior of said housing,
at least a portion of the housing defining the illuminated portion of said housing being capable of transmitting said light generally laterally of said device when said device is afloat,
a float mounted on the outside of said housing and slidable relative to the longitudinal axis of said tubular sections,
said float being adapted to maintain said device in a generally upright position when afloat.

4,077,077
STABILIZER KEEL
Alex M. Harper, N. 7007 Jefferson, Spokane, Wash. 99208
Filed Jan. 13, 1977, Ser. No. 759,236
Int. Cl.[2] A63C *5/00*
U.S. Cl. 9—310 A 8 Claims



1. A stabilizer keel attachment for a water ski, and the like, having a forward direction of motion relative to the water comprising:
a keel base member having a forward leading edge and a

rearward trailing edge and adapted to be mounted to the lower surface of the water ski;

a pair of keel plates;

hinge means on said base member pivotably mounting said keel plates to said base member for pivotal movement of the keel plates about a hinge axis located rearwardly adjacent to the leading edge of the base member, said keel plates being movable between a first outwardly extended position and a second closed position; said keel plates being adapted to be inclined relative to the lower surface of the water ski in said first position and being adapted to be perpendicular to the lower surface of the water ski in said second position;

said hinge axis being located within a plane perpendicular to the lower surface and longitudinally bisecting the base member;

abutment means on said keel base member for preventing pivotal movement of the respective keel plates to opposite longitudinal sides of the base member; and

resilient biasing means operatively engaging the keel plates for urging the keel plates to pivot apart from each other into said first position about the hinge axis and for allowing the keel plates to assume said second position in which said keel plates are parallel alongside one another in response to the force of water applied thereto.

4,077,078

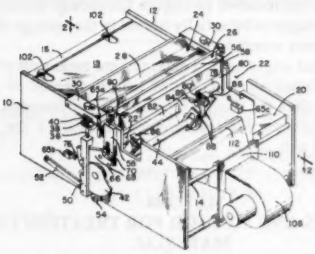
BOOK COVER APPLICATOR

Donald L. Snellman, 2807 W. Galer, Seattle, Wash. 98199, and John C. Kuspert, 8844 36th SW., Seattle, Wash. 98126

Filed Mar. 1, 1976, Ser. No. 662,321

Int. Cl.[2] B42C *19/00, 11/02*

U.S. Cl. 11—1 AD **15 Claims**



1. A book cover applicator for applying a cover to a filler having a spine coated with a heat activatable adhesive, said applicator comprising: sheet contact means including a sheet support surface for positioning the filler and cover with the spine and a portion of the cover at a cover application station located adjacent said support surface; and bonding means mounted adjacent said cover application station for activating the spine adhesive by heat application and then effecting an adhesive bond formed by the spine adhesive between the spine and said cover portion, said bonding means including an elongated heat application element movable to and from a heat application position in thermally conductive relation with the spine adhesive.

4,077,079

PIPELINE PIG

Mary M. Knapp, 1209 Hardy St., Houston, Tex. 77020

Filed Aug. 19, 1976, Ser. No. 716,029

Int. Cl.[2] B08B *9/04*

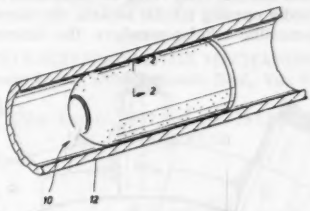
U.S. Cl. 15—104.06 R **4 Claims**

1. An improved pipeline pig which comprises:

an elongate body having an outer surface thereon which is adapted to pass through a pipeline;

a cloth backing embedded in the surface of said body having a plurality of U-shaped staples extending radially outwardly of the pig; and

a supplemental elastomeric coating on said pig body which



coating surrounds the legs of the U-shaped staples and which coating is applied to a thickness bringing its outer surface to a depth approximately equal to the length of the staple legs extending from the pig.

4,077,080

DEVICE FOR PASSING THROUGH PIPELINES

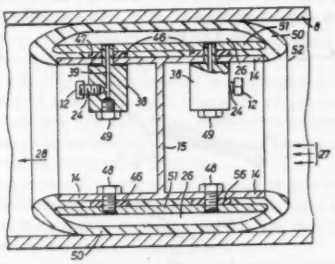
Louis Anthony Ralph Ross, 54 Llanvair Dr., South Ascot, Berkshire, England

Filed Oct. 3, 1975, Ser. No. 619,473

Claims priority, application United Kingdom, Oct. 4, 1974, 43231/74

Int. Cl.[2] F16L *55/10*

U.S. Cl. 15—104.06 R **3 Claims**



1. A device for passing through a pipeline comprising a cylindrical structure with open ends and a dividing wall extending across the cylindrical space within it at a point between said ends; a flexible cylindrical sleeve located firmaly around an outer curved surface of the structure, the sleeve defining a closed annular chamber which is capable of expansion by internal fluid pressure; and two fluid connections to said chamber, positioned one on each side of said dividing wall and accessible one from each end of the structure; said fluid connections being connectible to alternative fluid supply pipelines whereby the device may be operated optionally in either direction through a pipeline.

4,077,081

SWEEPER BRUSH SECTION

Arthur E. Drumm, Rte. 1, Marysville, Ohio 43040

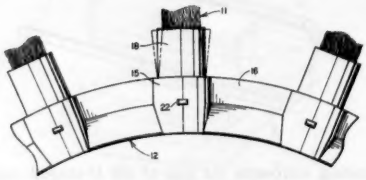
Filed Oct. 19, 1976, Ser. No. 733,899

Int. Cl.[2] A46B *7/10*

U.S. Cl. 15—181 **2 Claims**

1. A brush section comprising a channel body having spaced outwardly-opening bristle-receiving sockets, tufts of bristles disposed in said sockets, means for securing the tufts in said sockets, said means comprising sleeve members enclosing the inner ends of said tufts but extending outwardly from said sockets, said sockets being slightly larger than the sleeve members in the direction of extent of the body, and fasteners extending transversely through said sockets and sleeves to permit limited pivotal movement of said sleeves longitudinally of the

body, said tufts of the bristles being doubled into U-form with the U-form ends enclosed within said sleeve members, said fasteners also passing through amd within the U-form ends of the tufts, said channel body being of metal deformed to provide outwardly opening tubular sockets, the sleeve members being non-metallic tubular members, the fasteners passing



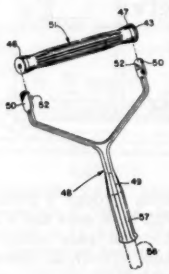
through said members at points spaced outwardly from the inner extremities thereof, said tubular sockets tapering and being of greater diameter of their outer ends than the outer diameter of the sleeve members, but of lesser diameter at their inner ends than the diameter of the inner extremity of said sleeve members.

4,077,082

ROLLER COVER SUPPORT FOR PAINT ROLLER FRAME

Elverton O. Roe, and Charles Gregg Moore, both of Wooster, Ohio, assignors to The Wooster Brush Company, Wooster, Ohio

Division of Ser. No. 520,666, Nov. 4, 1974, Pat. No. 3,986,226. This application May 19, 1976, Ser. No. 687,928
Int. Cl.² B05C *17/02*
U.S. Cl. 15—230.11 **9 Claims**



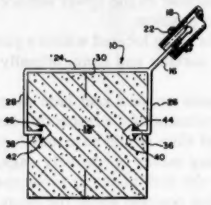
1. A roller cover support and paint roller frame comprising a plastic molded sleeve having means thereon for frictionally retaining a roller cover on such sleeve, separately formed end caps secured to the ends of said sleeve, said end caps having bearings for journaling of said roller cover support on said paint roller frame, said paint roller frame comprising a handle portion and a pair of spaced apart end mounts for receipt of said roller cover support therebetween, one of said end mounts and bearings having stub shafts thereon for receipt in openings in the other of said end mounts and bearings, said sleeve being blow molded as a single piece from a high density plastic material having high impact resistance and controlled flexibility for firmly gripping the roller cover and controlling the amount of pull off required to remove the roller cover from said support for ease of cleaning and replacement, said end caps being injection molded to form said bearings for rotatably mounting said roller cover support on said paint roller frame and support said sleeve against collapse or flattening out during use under pressure, said ends of said sleeve having integrally blow molded protrusions thereon of reduced diameter, said protrusions having outer faces in the form of flanges with central openings in said flanges said end caps having annular hub portions which extend over said reduced diameter protrusions on said sleeve ends, said hub portions contacting said sleeve ends and being of the same O.D. as said sleeve ends adjacent said protrusions.

4,077,083

RETAINER FOR A SPONGE RUBBER MOP

Herbert A. Siemund, and Earl Wilson, both of Chicago, Ill., assignors to Greenview Manufacturing Company, Chicago, Ill.

Filed Jul. 6, 1976, Ser. No. 702,522
Int. Cl.² A47L *13/46*
U.S. Cl. 15—244 R **6 Claims**



1. In a sponge mop having a sponge member with at least two opposed longitudinal surfaces, each of said surfaces having a longitudinal outwardly opening slit, the slits lying generally in the same plane, a sponge retaining member having an integrally formed generally channeled-shaped structure opening downwardly and having a top and side walls, the side walls terminating adjacent their bottom edges in inwardly extending flanges extending substantially perpendicular to said side walls, said flanges having a first thickness and free inner edges, said slits having a substantially constant width less than said first thickness, said flanges engaged within a pair of said opposed slits of the sponge member to engage the sponge member with the free inner edges substantially buried in the sponge member, the improvement comprising:

said free inner edges having enlargement means substantially along substantially the entire length thereof of greater thickness than the flanges substantially surrounded by said sponge member for resisting withdrawal of the flanges from said slits.

4,077,084

APPARATUS AND METHOD FOR TREATING LINEAR MATERIAL

Gustav E. Benson, Edgewood, and Everett W. Taylor, Cumberland, both of R.I., assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Division of Ser. No. 166,222, Jul. 26, 1971, Pat. No. 3,763,526, which is a division of Ser. No. 836,457, Jun. 25, 1969, abandoned. This application Jul. 12, 1973, Ser. No. 378,755
Int. Cl.² B65H *54/86;* **D01H** *11/00*
U.S. Cl. 15—306 A **9 Claims**

1. A method of processing multifilament linear textile material comprising:

withdrawing multifilament linear textile material from one end of a wound package of the textile material;

linearly advancing the linear textile material away from the package into an air outlet of a first passageway disposed so that such outlet generally faces the end of the package;

discharging an air stream from the outlet with sufficient energy to remove undesired matter from the advancing linear textile material, the stream yielding the undesired matter to the atmosphere; and

drawing air in the vicinity of the stream away from the stream into a second passageway to move separated and undesired matter yielded to the atmosphere to a collection zone.

4. Apparatus for handling linear textile material comprising:

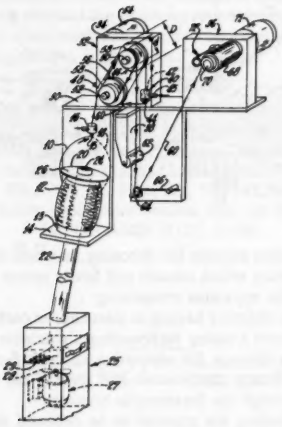
a wound package of linear textile material;

means in spaced relation at one end of the package defining

a passageway having an air discharge outlet generally facing the one end of the package;

means for supplying air under pressure to the passageway to discharge a stream of air from its air discharge outlet;

means for linearly withdrawing the linear textile material from the outer surface of the package and over the one end thereof into the air discharge outlet, the air supply



means supplying air under sufficient pressure to discharge the stream from the outlet with sufficient energy to separate undesired matter from the linear material during its advancement in the stream; and

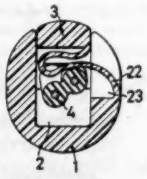
means for drawing air away from the vicinity of the stream to remove the separated matter yielded to the atmosphere by the stream away from the textile material for collection.

4,077,085

STRAIN RELIEF GROMMET

Takuo Yuda, Yokohama, Japan, assignor to Nifco Inc., Tokyo, Japan

Filed Jul. 1, 1976, Ser. No. 701,834
Claims priority, application Japan, Jul. 1, 1975, 50-91294[U]
Int. Cl.² H01B *17/26*
U.S. Cl. 16—2 **4 Claims**



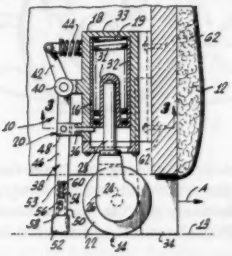
1. A one-piece plastic strain relief grommet adapted for positioning in an apertured panel, said grommet including a female member having a flanged U-shaped head end and a chamber for accommodating an elongated electrical conductor means, a male member having a flanged head end complimentary to said female head end, said male member further having means for cooperatively distorting and locking said conductor means within said chamber, said female member being provided with a lateral slot communicating with said chamber through its side wall and a resilient foldable elongated connecting means integrally connected at opposite ends thereof to said female and male members, said connecting means being long enough for passage of the major portion thereof through said lateral slot in folded overlying relation to said conductor means when said male and female members are moved into juxtaposed locking relationship relative to said conductor means, whereby said connecting means is positioned internally of said grommet when positioned for mounting in said apertured panel.

4,077,086

RETRACTABLE CASTOR MECHANISM

Michael James Butler, 6524 Sepulveda Blvd., Van Nuys, Calif. 91402

Filed Jan. 10, 1977, Ser. No. 757,983
Int. Cl.² B60B *33/06*
U.S. Cl. 16—33 **11 Claims**



1. A retractable castor mechanism for mounting on a movable article so that the article can be rolled along a floor comprising:

a housing;

a retaining member slidably received by said housing for vertical reciprocation therein and including an outer sleeve and an inner socket;

a castor having a shank inserted in said socket and movable with said retaining member between an extended operative position and a retracted inoperative position;

a spring disposed within said sleeve and biasing said caster toward said operative position;

latching means for latching said castor in said inoperative position against the force of said compression spring;

said latching means including a latch pin movable into a retaining member engaging position;

a releasing lever pivotably mounted on the outside of said housing and connected to said latch pin;

said releasing lever having a foot portion positioned with respect to said housing to frictionally engage said floor when said castor is in said inoperative position; and

latch spring means for urging said foot portion toward said floor and simultaneously urging said latch pin toward said socket engaging position, whereby said retaining member and said castor can be released by said latch pin to move said castor from said inoperative position to said operative position by moving said article relative to said floor.

4,077,087

CASTER AND BRAKE ASSEMBLY

Paul C. Mooney, Northbrook, Ill., assignor to Quick-Set, Incorporated, Northbrook, Ill.

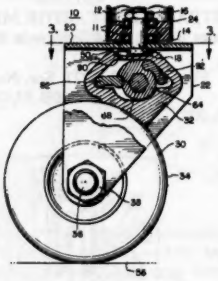
Filed Dec. 10, 1976, Ser. No. 749,530
Int. Cl.² B60B *33/02*
U.S. Cl. 16—35 R **7 Claims**

1. In a swivel caster having a base attached to a vehicle and a clevis supported from a kingpin having a longitudinal axis and secured to the base for swivel motion about the base, the clevis supporting a wheel, the wheel being rotatable on an axle, the improvement comprising:

the base secured to the vehicle to form an integral part therewith and having a generally flat lower surface;

wedge-shaped brake means mounted in said clevis and including portions extending through the clevis adjacent

said kingpin along axes generally parallel to the longitudinal axis of said kingpin, said brake means engageable with the wheel and the flat lower surface of the base to preclude rectiiinear and swivel motion of the vehicle when engaged;



means for selectively moving said brake means into engagement with the wheel and said flat lower surface; and

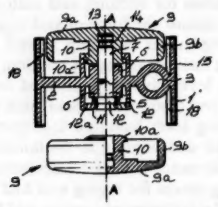
means for selectively moving said brake means into disengagement from the wheel and said flat lower surface.

4,077,088

TWO WHEEL CASTOR PARTICULARLY FOR FURNITURE

Francescantonio Melara, Via Ferrarese, 8, Bologna, Italy

Filed Sep. 17, 1976, Ser. No. 724,181
Claims priority, application Italy, Sep. 22, 1975, 27500/75
Int. Cl.[2] B60B *33/00*
U.S. Cl. 16—47 **1 Claim**



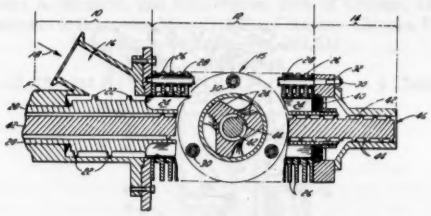
1. A castor of the kind comprising a vertical wall, a cylindrical seat formed in said wall perpendicularly thereto and defining front bushings on both sides of said wall, a spindle rotatably supported in said seat and having its opposite ends projecting out of said seat on both sides thereof, a pair of wheels secured on said opposite ends and having tubular hub portions provided with outer collars close to said front bushings, a sleeve formed in said wall in the same plane thereof and perpendicular to and laterally offset from said spindle for rotatably supporting a pivot pin adapted to be located in a vertical socket of the article to which the castor is to be fitted, a plurality of hook members provided on both sides of said wall and concentrically arranged around said spindle so as to define regular interspaces, said hook members having inwardly projecting lips engaging said collars for axially retaining said wheels, wherein according to the improvement between adjacent hook members tabs are provided axially extending from both sides of said wall and such as to close the interspaces existing between said adjacent hook members, the free ends of said tabs projecting above said collars.

4,077,089

PROCESS AND APPARATUS FOR MEAT DEBONING

Theodore Gregoire Dutaud, 143 Viewbank Crescent, Oakville, Ontario, Canada

Filed Mar. 30, 1976, Ser. No. 671,942
Int. Cl.[2] A22C *25/16*
U.S. Cl. 17—1 G **22 Claims**



1. An apparatus suitable for deboning materials such as fish and meat products which contain soft fleshy matter and boney components, the apparatus comprising:

a turbulating chamber having an inlet end, an outlet end, and a foramenous housing surrounding a rotatable shaft having means thereon for separating the soft fleshy matter from the boney components and forcing the soft fleshy matter through the foramenous housing;

means for feeding the material to be deboned through the inlet end of the turbulating chamber;

means for rotatably driving the rotatable shaft having means thereon;

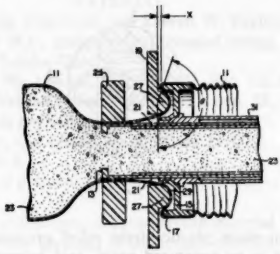
the apparatus characterized wherein said means for feeding the material to the inlet end of the turbulator feeds the material at a rate independent of the rate at which the means for rotating the rotatable shaft is driven.

4,077,090

FOOD CASING STUFFING SIZING CONTROL APPARATUS

Paul Howard Frey, La Grange, and Vytautas Kupcikevicius, Chicago, both of Ill., assignors to Union Carbide Corporation, New York, N.Y.

Filed May 14, 1976, Ser. No. 686,425
Int. Cl.[2] A22C *11/02*
U.S. Cl. 17—41 **3 Claims**



1. In apparatus for stuffing continuous lengths of food casing which have been shirred and mounted on a stuffing horn over a sizing disc disposed interiorly of the casing with an outer circumference stretch-contacting the inner surface of the casing as it deshirrs, and through a casing circumference contracting passage defined between the inner circumference of an annular snubbing ring and the outer circumferential surface of the stuffing horn, the distance along the casing between said sizing disc and said annular snubbing ring being controllably variable,

the improvement comprising an annular projection at the

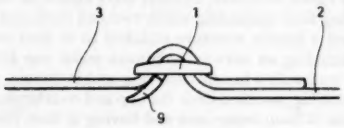
inner circumference of said annular snubbing ring extending in a direction opposite the direction of progression of casing being stuffed, defining a casing outer surface peripheral contact surface which is generally arcuate in the direction of casing progression, and means on the sizing disc to vary the contact area between the casing outer surface and said contact surface on said projection, between minimal contact when maximum distance between the sizing disc and the snubbing ring obtains, and maximal contact when minimum distance between the sizing disc and the snubbing ring obtains.

4,077,091

STRAP ADJUSTING DEVICE

Trygve Liljedahl, Lillehammer, Norway, assignor to Trygve Liljedahl Skistavfabrikk A/S, Lillehammer, Norway

Filed Nov. 16, 1976, Ser. No. 742,285
Claims priority, application Sweden, Nov. 20, 1975, 7513041
Int. Cl.[2] A44B *11/25, 11/00*
U.S. Cl. 24—77 R **5 Claims**



1. A strap adjusting device for an adjustable hand strap on a ski pole, comprising:

a clasp,

a first strap part adapted to be fastened at one end to the ski pole and, at the other end, in nonadjustable relationship with the clasp,

a second strap part also adapted to be fastened at one end to the ski pole and, at the other end, in adjustable relationship with the clasp,

the clasp including one middle rod and two outer rods all oriented across the direction of the strap parts and defining between said rods two openings for the strap parts, and two pieces oriented along the strap parts and joining said rods,

said two strap parts being passed in opposite directions into the clasp under the two outer rods and over the middle rod,

said first strap part in nonadjustable relationship with the clasp is provided with a tab integral therewith, the width of which tab is greater than the width of the openings of the clasp, the openings having dimensions adapted to the width and thickness of the strap parts.

4,077,092

PIVOTED CLIP

John Basevi, Hotel Plaza, Suite 2402, Causeway Bay, Hong Kong

Filed May 9, 1977, Ser. No. 795,289
Int. Cl.[2] A44B *21/00*
U.S. Cl. 24—81 CC **16 Claims**

1. A pivoted clip comprising

A. a pair of elongated arms,

I. said arms being transversely registered with a surface of each arm facing a surface of the other arm,

II. each arm having a track on the surface thereof facing the opposite arm,

a. said tracks being in registry, and

B. a floating resilient fulcrum interconnecting said arms,

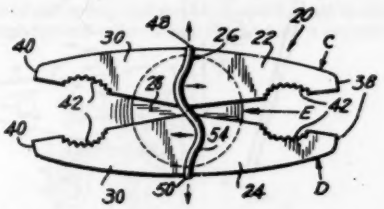
I. said fulcrum including a disc member between said arms and having diametrically opposite portions riding on said track, and

II. a hinge member articulatably connected to both said arms at points adjacent to longitudinal centers thereof,

a. said points being spaced apart transversely of the lengths of said arms,

III. at least one of said members being resilient,

IV. the space between the surface of the track on which the disc rides adjacent the hinge member being less than the diameter of the disc when the tips of the arms at either end of the clip are closed and the tips of the arms at the other end of the arms are spaced apart,



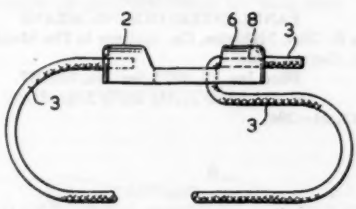
V. whereby when a pair of spaced tips at either end of the arms are urged by an external force together the disc will shift from one side of the hinge member where the tips are spaced, increasing the outward force exerted on said surface of the tracks as the disc crosses the hinge member, and the disc will snap toward the other side of the hinge member after the disc crosses the hinge member whereby the resilient member will urge together the ends of the arms on the side of the hinge member remote from the disc.

4,077,093

FASTENING DEVICES

Roger B. Emery, Fuchia Cottage, Glen Auldyn, Ramsey, Isle of Man

Filed Jul. 20, 1976, Ser. No. 707,021
Int. Cl.[2] F16G *11/00*
U.S. Cl. 24—130 **8 Claims**



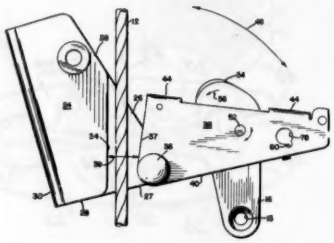
1. A buckle-type fastener comprising a body part with a central portion and two end portions on opposite sides of the central portion and having an aperture through the central portion, means at one end portion for anchoring one end of a cord permanently to the body part, and a nose at the other end portion, the nose having a slot which is longitudinal with respect to the body and in a direction towards the aperture, the slot in the nose having an inward end at the aperture, side walls, depth and a solid longitudinal base, the side walls being convergent over part of the depth of the slot and then divergent towards the base of the slot; the convergent wall parts having inner ends which form a constriction and provide a portion of the slot below the constriction so that a cord of appropriate thickness forced into the slot through the constriction is entrapped in the portion of the slot below such constriction, said aperture having a side wall, adjacent the inward end of the slot, formed with a V-shaped groove extending in the direction of the depth of said slot.

4,077,094

CLAMPING DEVICE FOR A ROPE, CABLE, ANNULAR BAR, OR THE LIKE

William E. Swager, P.O. Box 656, Fremont, Ind. 46737

Filed Sep. 17, 1976, Ser. No. 724,457
Int. Cl.[2] F16G *11/10;* A62B *1/14*
U.S. Cl. 24—134 R 8 Claims



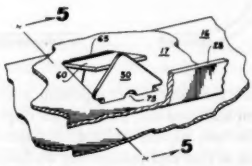
1. A safety clamp for mounting about and clampingly engaging an elongated body of the character of a rope, cable, bar, pipe or the like comprising a pair of housing members, pivot means securing said members together nestably for pivotal movement from closed clamping position nested together, and allowing pivotal movement to open position and providing open lateral space for inserting and mounting about said elongated body, said housing members comprising a larger member nestably encasing a smaller member in closed pivot position forming an inner space therebetween sized to enclose, slidably receive and guide said elongated body in relative movement therein, means for releasibly fastening said housings together in operative clamping position upon said elongated body, and manually actuated clamping means supported in said smaller housing member in spring biased position for engaging and gripping said elongated body immovably in clamped position thereon.

4,077,095

PANEL INTERLOCKING MEANS

James R. Oliff, Mableton, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Jan. 13, 1977, Ser. No. 759,057
Int. Cl.[2] B44D *21/00;* B65D *5/02, 85/00*
U.S. Cl. 24—204 10 Claims



1. An arrangement for interlocking a pair of panels in overlapping relation, said arrangement comprising a locking tab having shoulders projecting laterally from its sides and being struck from one of said panels and foldably joined thereto at its base, a retaining tab struck from the other of said panels and foldably joined thereto and defining a locking aperture in said other panel, a securing tab forming a projection of said other panel along a transverse edge of said locking aperture adjacent the free end of said retaining tab, and a securing aperture formed in said locking tab for receiving said securing tab when said locking tab is driven through said locking aperture and into a position of angular relation to said one panel.

4,077,096

CASKET HANDLE STRUCTURE

Francis R. Christian, 411 Ashland Ave., River Forest, Ill. 60305

Filed Dec. 6, 1976, Ser. No. 747,959
Int. Cl.[2] A61G *17/04*
U.S. Cl. 27—2 5 Claims

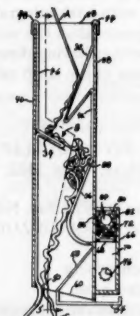
1. In a casket structure, a casket body closed on the bottom and having four upstanding walls, two end walls and two side walls, and a handle structure attached to at least one of the walls, including an outwardly convex metal cup attached to the side wall with a handle-receiving socket therein, a decorative plastic lug mounted over the cup and overlapping it so as to prevent it from being seen and having at least one handle-receiving opening therein aligned with and exposing the cup socket, and a handle mounted on the casket body with an inwardly extending leg extending through the opening in the lug and pivotally mounted in the cup socket so that the loads applied to the handle will be passed through the lug without affecting it and will be transmitted directly to the cup.

4,077,097

APPARATUS FOR DEVELOPING BULK IN A STRAND OF SYNTHETIC TEXTILE YARN

William Allen McNeill, Gastonia, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Division of Ser. No. 310,476, Nov. 29, 1972, abandoned, which is a continuation-in-part of Ser. No. 169,001, Aug. 4, 1971, abandoned. This application May 17, 1976, Ser. No. 687,031
Int. Cl.[2] D02G *1/16*
U.S. Cl. 28—281 20 Claims



1. An apparatus for developing bulk in a strand of synthetic textile yarn comprising a generally vertically extending bulking chamber through which yarn may be fed for bulking, means for feeding yarn continuously in a generally downward direction into said bulking chamber in a substantially tensionless condition, means for applying heat and moisture to the yarn in said bulking chamber, and means for partially obstructing downward movement of said yarn including at least one baffle plate disposed in said bulking chamber under the path of

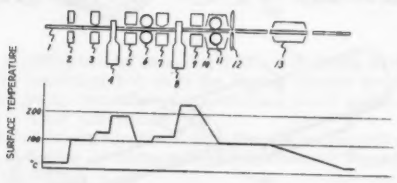
the yarn being fed by said feeding means to obstruct partially the generally downward feeding of the yarn and thereby cause said yarn to be substantially completely relaxed at said baffle plate for substantially complete development of bulk in the yarn by the influence of the applied heat and moisture on said substantially completely relaxed yarn, said baffle plate being inclined downwardly to allow said yarn to fall freely therefrom for discharge from said chamber in relaxed and bulked condition.

4,077,098

APPARATUS FOR MANUFACTURING A METALLIC TUBE COATED WITH A THERMOPLASTIC RESIN FILM HAVING LITTLE RESIDUAL STRAIN

Saburo Ayusawa, and Mansei Tanaka, both of Kimitsu, Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 7, 1975, Ser. No. 565,364
Int. Cl.² B05D *1/26, 3/00;* **B21C** *37/06*
U.S. Cl. 29—33 T **6 Claims**



1. In apparatus for manufacturing a metallic tube coated with a thermoplastic resin film having little residual strain comprising a cleaning means for cleaning said metallic tube, a coating means for coating the so cleaned metallic tube with thermoplastic resin, a cutting means for cutting the so coated metallic tube to lengths and a forced shrinking means for forcibly cooling the cut metallic tube, the improvement wherein each of said means is positioned successive to one another with said cleaning means upstream of said coating means which in turn is upstream of said cutting means which in turn is upstream of said forced shrinking means, said forced shrinking means comprising transporting means for transporting said cut lengths of tube in a direction perpendicular to its axis and successive cooling means which initially cool said tube in the center thereof and successively cool regions of said tube towards the ends thereof.

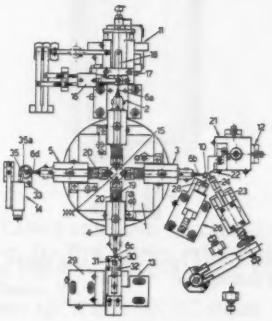
4,077,099

MACHINE FOR THE PRODUCTION OF HELICAL SPRINGS AND FOR THEIR INTRODUCTION INTO HOLLOW ANNULAR SAFETY CATCHES FOR NECKLACES

Alfredo Cantini, P.za Giotto 20, Arezzo, Italy (52100)

Filed Oct. 7, 1976, Ser. No. 730,617
Int. Cl.² B23P *23/00*
U.S. Cl. 29—38 C **4 Claims**

1. A machine for the construction of helical springs and for their insertion into annular hollow safety catches for necklaces, bracelets and the like, comprising a revolving table pivotally mounted about a vertical axis (X—X) and associated with means adapted to let said revolving table pivot at predetermined time intervals through an angle of 90° about said axis, four indentical pliers units angularly spaced away from each other by an angle of 90° along the periphery of said revolving table, said pliers units being supported by supports cooperating with radial guideways and with springs adapted to push said supports outwardly until said pliers units extend beyond the periphery of said revolving table, each of the pliers units having gripping arms in vertical superposed relationship which are forced to approach and to clamp one against the other under the action of springs; and four work station each placed in the front of one of the stop positions of said pliers units, the first station including a container in which are inserted in column a plurality of safety catches provided with a slider but yet lacking in springs and which have vertically offset ends, said container including a lower slide device adapted to push outwardly the lowermost catch of the column into the open arms of the facing pliers unit, the second station comprising means constituting an abutting surface for the outermost portion of said catch, as well as an apparatus for the construction of a continuous a helical spring from a continuous wire and which cooperates with a cutting device to cut a length of a predetermined value of said spring, and means for pushing said spring length through the end orifice of said catch which is opposite



to that where the slider has been mounted which has an outwardly projecting control prong and a means adapted to obtain a projection into the inner surface of the annular catch to lock one end of the spring at a predetermined distance from the entrance orifice of said spring, the third station comprising means to move said slider backwardly so as to force said slider to come back into the catch inner cavity against the action of the inner spring and a pliers device to bring into register the vertically offset ends of said safety catch, the fourth station comprising means to control the planarity of the safety catch as well as means to provide signals under the control of a sensing head to separate the good pieces from the faulty ones.

4,077,100

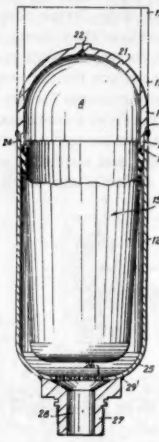
METHOD OF FORMING PRESSURE ACCUMULATOR

Abduz Zahid, Los Angeles, Calif., assignor to Greer Hydraulics, Inc., Los Angeles, Calif.

Division of Ser. No. 552,425, Feb. 24, 1975. This application Apr. 9, 1976, Ser. No. 675,519
Int. Cl.² B23P *15/00*
U.S. Cl. 29—157 R **5 Claims**

1. The method of forming a pressure accumulator of the type having a deformable separator therein in the form of a bladder having an enlarged diameter open mouth and a closed end, which comprises the steps of forming a first shell portion having a cylindrical body with an open mouth at one end and a closed portion at the other end, said closed portion having a passageway therethrough, providing a cylindrical sleeve open at one end and having said enlarged diameter mouth of said bladder bonded to the other end, said closed end of said bladder projecting beyond said other end of said sleeve, inserting said other end of said sleeve and said closed end of said bladder into the open mouth of the cylindrical body of said first shell portion, securing said shell portion and said sleeve together at

a position adjacent said mouth of said shell, and thereafter deforming said open end of said cylindrical sleeve inwardly to



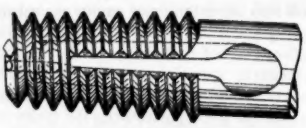
close said theretofore open end of said sleeve and entrap the surrounding atmosphere.

4,077,101

DRIVER FOR HELICAL THREAD INSERTS

Robert P. Wallace, Dean's Corner, Rte. 22, Brewster, N.Y. 10509

Filed Jun. 3, 1976, Ser. No. 692,587
Int. Cl.² B23P *19/04*
U.S. Cl. 29—240.5 **16 Claims**



1. A cross-thread resistant drive mandrel for inserting spiral inserts having drive tangs into tapped bores which are undersized as respects the diameter of said inserts comprising, in combination, an axially elongated, generally cylindrical resilient polymeric body portion including a drive insert end and a torque applying end, said body portion having a threaded external peripheral portion for supporting said inserts, said threaded portion beginning adjacent said drive end and extending at least partway toward said torque applying end, a drive tooth formed at and projecting axially beyond said drive end of said body portion, said tooth including a generally radially directed drive shoulder positioned to engage the tang of an insert mounted on said mandrel and a lip member extending in leading position relative to said drive shoulder, viewed in the direction of rotation of said body portion in the insert driving mode, said lip member being located axially beyond said drive shoulder and defining with said shoulder a retainer pocket adapted to overlie portions of the drive tang of an insert mounted on said mandrel, a rigid torque transmitter member embedded in the body of said mandrel, said torque transmitter member including portions extending along a longitudinal zone of said mandrel adjacent said drive end, said torque transmitter member including a portion disposed immediately at said drive shoulder and other portions extending into said lip member.

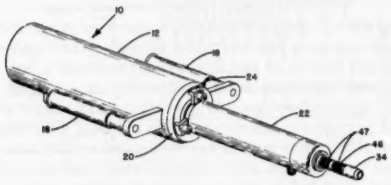
15. A cross thread resistant drive device for inserting spiral thread inserts having drive tangs into tapped borew which are undersized relative to the outside diameter of said inserts comprising, in combination, an axially elongated mandrel having a drive end and a torque applying end, an external threaded portion on said mandrel adjacent said drive end for supporting a said insert on said mandrel while limiting axial extension thereof, drive means on said drive end of said mandrel for engaging said tang and transmitting torque to said insert responsive to rotation of said mandrel, said mandrel being characterized by the portion thereof in registry with the trailing end of said insert forming a part of said threaded portion and being radially inwardly compressible and providing an intimate fit with the inner diameter of said insert in the unstressed condition thereof.

4,077,102

TUBE EXTRACTING MECHANISM

Joseph W. Smith, Dayton, Ohio, assignor to Carrier Corporation, Syracuse, N.Y.

Filed Jun. 28, 1976, Ser. No. 700,355
Int. Cl.² B23P *19/04*
U.S. Cl. 29—252 **1 Claim**



1. A mechanism for extracting tubes from a tube sheet comprising:

housing means formed with a central opening in one end and positioned in proximity to said tube, said housing means having a passage extending axially thereof in communication with said opening;

inner piston means reciprocally disposed in said housing passage in spaced relation to the inner surface of said housing, a first end of said piston means extending through said central opening;

expansion means connected to said first end of said pg,14 inner piston means for movement therewith;

outer piston means disposed in said housing passage in said space defined between said inner surface of said housing and said inner piston means and having a first end terminating in proximity to said central opening;

expandable jaw means connected to said first end of said outer piston means and extending into the bore of said tube;

hydraulic supply means including a source of fluid and first passage means in communication with said fluid source to supply said fluid to said inner piston means to thereby generate a force acting thereon to move said piston means in said passage away from said central opening to bring said expansion means into engagement with said jaw means to expand said jaw means outwardly into engagement with the inner surface of said tube, said supply means further including a pressure relief valve to prevent the hydraulic pressure acting on said inner piston from exceeding a predetermined magnitude; and second passage means communicating with said source of fluid to deliver said fluid to said outer piston including a pressure sensitive switch responsive to the pressure of said fluid in said first passage means to cause the fluid to flow through said second passage means when the pressure acting on said inner piston means attains said predetermined magnitude, said fluid in said second passage means developing a force acting on said outer piston means to move said piston means away from said central opening to extract said tube from said tube sheet; and

safety means disposed within said housing passage in spaced

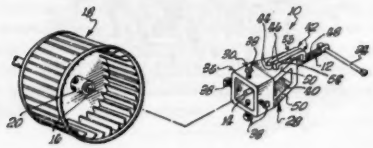
relation to an end wall thereof for preventing said inner piston means from moving beyond a predetermined distance within said housing passage when said force is acting thereon.

4,077,103

PULLING TOOL

Eugene M. Kelley, 1796 Larkspur, Pomona, Calif. 91766

Filed Sep. 27, 1976, Ser. No. 726,930
Int. Cl.[2] B23P *19/04*
U.S. Cl. 29—259 6 Claims



1. A pulling tool for removing from a shaft a rotor having an axially projecting hub or a fan having radially projecting blades spaced circumferentially about and joined at their inner ends to a hub, comprising:

a screw having a front end for seating against one end of said shaft with the screw substantially coaxially aligned with the shaft,

a nut threaded on said screw,

rotor gripping means comprising an axially projecting skirt on said nut about said front screw end for surrounding an axially projecting hub of a rotor on said shaft, and bolts threaded radially in said skirt for gripping said rotor hub, and

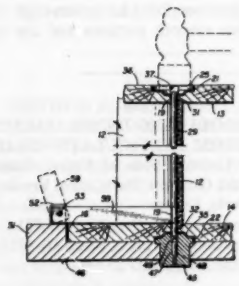
fan gripping means on said nut for engagement with a fan on said shaft comprising hook-like fingers for hooking engagement behind a fan on said shaft through the spaces between the adjacent fan blades and means mounting said fingers on said nut for movement to extended positions wherein said fingers project forwardly of said skirt for engagement with a fan on said shaft and to retracted positions wherein said fingers clear said skirt for surrounding a hub on said shaft, and means for releasibly retaining said fingers in retracted position.

4,077,104

REEL CONSTRUCTION AND ASSEMBLY APPARATUS

Robert M. Miller, Denver, Colo., assignor to Denver Wood Products Co., Denver, Colo.

Filed Jun. 4, 1976, Ser. No. 693,065
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—271 11 Claims



1. Apparatus for use when assembling reel structures that include a center drum disposed between first and second side flanges, each of which provide a mandrel opening, comprising an assembly table, a raised central plug on said table of size corresponding to the size of said mandrel openings for centering said second flange on said table, a plurality of pivotally mounted guide arms disposed above said central plug for movement to alternate axial and radial positions, guide fingers on the terminal free ends of said guide arms, said guide arms in the axially directed position providing outwardly disposed action surfaces for engagement in the mandrel opening of said second flange to move said second flange toward a centered position, and said guide fingers in the radially disposed position providing means for contacting inner surfaces of said center drum to center said drum.

4,077,105

VERTICAL FLANGE CLIP AND INSTALLATION TOOL

W. David Boyce, Jr., West Chester, and Donald E. Kearns, Downingtown, both of Pa., assignors to Ladd Tool Sales Co., Inc., West Chester, Pa.

Filed Apr. 7, 1976, Ser. No. 674,435
Int. Cl.[2] B25B *27/14*
U.S. Cl. 29—278 8 Claims

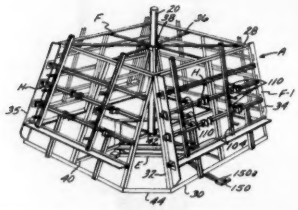
1. A vertical flange clip of spring steel or the like in combination with a tool for installing the clip onto elevated vertical flange structure, said vertical flange clip comprising a flat body portion with opposite open areas therein arranged to receive an installation tool, an inverted U-shaped top portion integral with the flat body position, and gripping structure on one of the legs of the inverted U-shaped top portion for anchoring the vertical flange clip in place when the inverted U-shaped portion thereof is forced onto elevated vertical flange structure, the installation tool having a main section with a pair of spaced apart fingers extending upwardly and outwardly therefrom, and clip support means located between the fingers and extending upwardly therefrom whereby the fingers of the installation tool are received into the opposite open areas in the flat body portion of the clip and the clip rests against the upright support means for elevating the clip into place over vertical flange structure after which the tool is downwardly pulled to force the U-shaped top portion of the clip onto that structure.

4,077,106

PALLET MAKING ASSEMBLY

Arthur L. Lichtenstein, Fresno; Vincent Petruzzi, San Carlos, both of Calif., and William M. Anderson, Jr., Spring, Tex., assignors to Betty A. Lichenstein, Fresno, Calif.

Filed Apr. 13, 1977, Ser. No. 779,023
Int. Cl.[2] B27M 3/00
U.S. Cl. 29—792 6 Claims



1. A first pallet-making assembly on which a plurality of spaced stringers and first deck boards are successively positioned to be nailed together to provide single face pallets, which assembly includes:

a. a base that has a center portion from which first, second, third and fourth elongate portions extend outwardly, said elongate portions being equally spaced from one another;

b. an upright of circular transverse cross section secured to said center portion;

c. a frame assembly that includes four side frames that extend upwardly and inwardly, each of which side frames include first and second end pieces and upper and lower horizontal cross pieces, upper and lower bearings rotatably supported at fixed positions on said upright, a plurality of upper and spaced arms that radiate from said upper bearing and are secured to said upper cross pieces, four equally spaced substantially horizontal lower arms that extend outwardly from said lower bearing to the centers of said lower cross pieces, and a plurality of vertically spaced elongate cross members that extend between saidf rist and second end pieces;

d. first means adjustably supported from each of said side frames for removably holding a plurality of said stringers in fixed positions on said side frames;

e. second means adjustably supported from each of said side frames for removably holding a plurality of said boards in parallel spaced relationship outwardly from said stringers and normal thereto; and

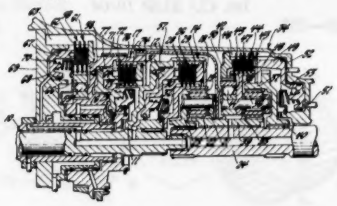
f. pressurized fluid operated power means connected to a source of pressurized fluid and controlled by manually actuatable means for intermittently rotating said frame assembly for each of said side frames to sequentially occupy first, second, third and fourth equally spaced stations, a plurality of said stringers being placed on each of said side frames to engage said first means when said side frame is at said first station, a plurality of said boards being placed on said stringer bearing side frame to engage said second means when said stringer bearing side frame is at said second station, said stringers and boards being nailed together to define a single face pallet when said side frame bearing the same is at said third station, and said single face pallet being removed from said side frame when said side frame is at said fourth station.

4,077,107

METHOD OF MANUFACTURING FRICTION PLATES AND PLATES MADE BY THE METHOD

David F. Reuter, Xenia, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Division of Ser. No. 634,253, Jan. 21, 1975, Pat. No. 4,010,831.
This application Nov. 26, 1976, Ser. No. 745,430
Int. Cl.[2] B21D 53/26, 53/00
U.S. Cl. 29—400 R 9 Claims



1. A method of manufacturing thin, flat and uniformly thick annular friction plates from thin flat long narrow straight sheet metal strips having inner and outer edges with a width sufficient to provide the full radial width of the annular friction plates and a thin thickness sufficiently larger to provide the thickness of said annular friction plates; the step of continuously edge coil rolling the straight strip into a flat annular coil by continuous power feeding the straight strip in a positive straight guide to a coiling station with the inner edge of the straight strip first contacting a mandrel roller and then curving into a coil with the outer edge of the coil contacting a coiling roller positioned to form the straight strip into a coil forming strip portion of an annular coil strip having the radius of the annular friction plates and with portions of the face surfaces of the coil forming strip portion of the annular coil strip in contact with coil forming lateral guide disks on each side of each roller and a portion of the coil forming strip portion being flat and uniform thickness and in surface to surface contact with the facing faces of the guide disks on one roller and the portion of the coil forming strip portion having a tapered cross section being in contact with a portion of the facing faces of the guide disks on the other roller to maintain the coil forming portion in a thin flat annulus during coil strip forming and with continuous power feeding forming a complete annular coil strip beyond the coiling roller; the step of cutting off each complete annular coil strip during continuous feeding to form thin flat annular coils with the ends in close proximate relation; the step of forming the strip to a cross section shape so the annular friction plates are uniformly thick and the step of forming spline tangs and intermediate smooth portions on one of the inner and outer edges of the strip and forming a smooth finished edge on the other of the inner and outer edges of the strip so the annular friction plates have one edge with spline tangs and intermediate smooth portions and the other edge smooth.

4,077,108

PROCESS FOR PRODUCING DENSE MACHINABLE ALLOYS FROM PARTICULATE SCRAP

Guy Mathern; Jean Lefevre, both of Ugine; Roland Tricot, Albertville, and Andre Guessier, Paris, all of France, assignors to Ugine Aciers, Paris, France

Filed Mar. 16, 1976, Ser. No. 667,521
Claims priority, application France, Mar. 21, 1975, 75 09563
Int. Cl.[2] B21C 23/04
U.S. Cl. 29—403 6 Claims

1. In a process for reclaiming base metal or alloy waste in divided state for producing a stainless steel workpiece of generally theoretical density having improved machinability due to the presence of at least one dispersed phase additive, the improvement comprising effecting uniform distribution of the

additive without remelting of the waste by the sequential steps of:

(a) admixing the at least one additive selected from the group consisting of S, Sn, Pb, Sb, Bi, Se, and Te and compounds thereof with at least a portion of the base metal or alloy waste;

(b) introducing the mixture of (a) into an open top cylinder of a base metal or alloy similar to the waste being processed;

(c) compacting the mixture within the casing to substantially less than theoretical density;

(d) removing excess casing above the upper surface of the compressed waste-additive mixture;

(e) impermeably sealing the open top of the casing; and

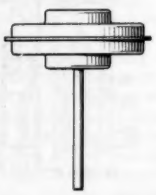
(f) consolidating the casing-waste metal-additive by hot working at a temperature below the melting point of the waste and at a temperature above the melting point of the at least one additive until a density generally equal to the theoretical density is reached.

4,077,109

HOT WORKING OF METAL POWDERS

Jay Michael Larson, Warwick, N.Y., assignor to The International Nickel Company, Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 684,479
Int. Cl.² B22F *3/24*
U.S. Cl. 29—420 **4 Claims**



1. In the process for producing consolidated metal articles by hot pressing metal powders isostatically wherein metal powder to be hot pressed is contained in a metal container and the resulting assembly is subjected to a combination of an elevated temperature and fluid pressure sufficient to hot press said metal powder the improvements comprising forming said metal container by welding together elements of superplastic metal sheet, placing the resulting weldment within a mold having the desired container shape, inflating the weldment within said mold using low internal pressure at the superplastic forming temperature for said superplastic metal while restraining substantial movement of the weld metal, whereby fracture of said weld is avoided, and thereafter introducing metal powder into the container and isostatically hot pressing the metal powder in the welded and inflated superplastic metal container.

4,077,110

METHOD FOR MAKING CANDLES

Wilfred L. Reiher, 4701 N. 55th St., Phoenix, Ariz. 85018

Continuation-in-part of Ser. No. 520,536, Nov. 4, 1974, abandoned. This application Nov. 24, 1975, Ser. No. 634,348
Int. Cl.² B23P *3/00, 25/00*
U.S. Cl. 29—458 **10 Claims**

1. A method of making candles comprising the steps of:

(a) sizing a solid slab of bulk wax into a plurality of pieces of solid wax with each of said pieces having a minimum mass of approximately 1 ounce;

(b) inserting a predetermined amount of said solid wax pieces into the interior cavity of a mold;

(c) compressing said inserted amount of solid wax pieces for movement thereof into conformity with the interior configuration of said mold to form a single unitary candle body;

(d) removing said candle body from said mold;

(e) drilling a wick receiving hole in said candle body; and

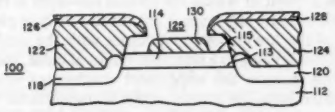
(f) inserting a predetermined length of wicking material into the wick receiving hole to complete making of said candle.

4,077,111

SELF-ALIGNED GATE FIELD EFFECT TRANSISTOR AND METHOD FOR MAKING SAME

Michael C. Driver, Penn Hills, and He B. Kim, Murrysville, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Jul. 14, 1976, Ser. No. 705,322
Int. Cl.² B01J *17/00*
U.S. Cl. 29—571 **4 Claims**



1. A method of making a self-aligned gate field effect transistor comprising the steps:

a. forming an N-type GaAs channel region on a semi-insulating GaAs substrate,

b. forming a layer of SiO_2 masking a portion of the channel region,

c. etching through unmasked portions of the channel region to expose portions of the substrate,

d. epitaxially growing N^+-type source and drain regions on the exposed portions of the substrate,

e. depositing source and drain electrodes on the source and drain regions and partially overlapping the SiO_2 layer,

f. removing the SiO_2 layer, and

g. depositing a gate electrode on the channel region while using said partially overlapping portions of the source and drain electrodes as masks to space the gate electrodes from each of the source and drain electrodes.

4,077,112

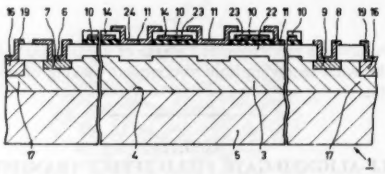
METHOD OF MANUFACTURING CHARGE TRANSFER DEVICE

Matthias Johannes Joseph Theunissen; Roelof Pieter Kramer, and Hermanus Leonardus Peek, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 611,647, Sep. 9, 1975, abandoned. This application Dec. 10, 1976, Ser. No. 749,336
Claims priority, application Netherlands, Sep. 24, 1974, 7412567
Int. Cl.² B01J *17/00*
U.S. Cl. 29—580 **7 Claims**

1. A method of manufacturing a charge transfer device comprising a semiconductor body having an electrode system provided on a surface for capacitively generating electric fields in the body by means of which electric charge can be trans-

ported through the body, said electrode system comprising a series of electrodes insulated from the surface of the body by an insulating layer and including lowermost conductors and uppermost conductors with each electrode of the uppermost conductors extending above an adjacent lowermost conductor and being separated therefrom by an intermediate insulating layer, comprising the steps of: forming on the surface of the semiconductor body said insulating layer having a double layer comprising a first sub-layer adjoining the surface of the body and a second sub-layer on the first sub-layer and constituted of a material differing from the first sub-layer and capable of masking the semiconductor body against oxidation and capable of being selectively removed relative to the first sub-layer,



forming on the double layer the lowermost conductors, subjecting the lowermost conductors to an oxidation treatment to obtain the said intermediate insulating layer, the second sub-layer masking the underlying material of the semiconductor body against oxidation during said oxidation treatment, thereafter subjecting the second sub-layer to a selective removal treatment as a result of which the second sub-layer is removed locally while the first sub-layer is left substantially in place, the electrodes of the lowermost conductors with the oxide layer formed thereon serving as a selective-removal mask, and thereafter forming thereon the uppermost conductors which become separated from the surface of the semiconductor body at least mainly only by the first sub-layer of the insulating layer.

4,077,113

METHOD OF MANUFACTURING AN ELECTRO-OPTICAL SWITCH

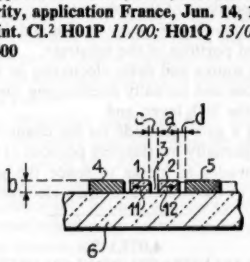
Michel Papuchon, Paris, France, assignor to Thomson-CSF, Paris, France

Division of Ser. No. 585,577, Jun. 10, 1975, Pat. No. 4,035,058. This application Dec. 7, 1976, Ser. No. 748,288

Claims priority, application France, Jun. 14, 1974, 74 20717

Int. Cl.[2] H01P *11/00;* **H01Q** *13/00*

U.S. Cl. 29—600 **3 Claims**



1. A method of manufacturing an electro-optical switch, wherein it comprises the following stages:

the deposition of a metal layer on a substrate of ferro-electric material;

the etching of said metal layer in order to expose the substrate in the form of two channels disposed parallel to over a given length, known as the coupling length, said channels being separated by a metal median band and hugged by metal side bands;

the deposition upon said metal layer and upon said channels, for purposes of diffusion, of a second layer of one material, and the diffusion into the substrate opposite said channels, of said second layer itself, thus forming two zones having optical refractive indices greater than that of the substrate, which zone constituted two radiated energy guides;

the creating of remanent electric polarizations in opposite senses in said zones by heating the assembly to beyond the Curie temperature and by applying a biasing voltage between said median band and said two side band;

the cooling of the assembly followed by the cancelling of the bias voltage;

the removal of said metal layer with the exception of two areas constituting two electrodes at either side of the guides, over the length L.

4,077,114

VACUUM POWER INTERRUPTER

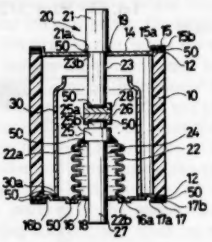
Shinzo Sakuma, Tokyo, Japan, assignor to Kabushiki Kaisha Meidensha and Kabushiki Kaisha Gemvac, both of Tokyo, Japan

Filed Mar. 17, 1976, Ser. No. 667,957

Claims priority, application Japan, Mar. 22, 1975, 50-35168; Mar. 22, 1975, 50-35166

Int. Cl.[2] H01H *11/00*

U.S. Cl. 29—622 **2 Claims**



1. A method of making a vacuum power interrupter comprises the steps of

(a) disposing a disc shaped upper end plate having an aperture in the center thereof and a disc shaped lower end plate on the ends of an insulating envelope, said plates being made of Fe-Ni alloy or Fe-Ni-Co alloy and having substantially the same coefficient of thermal expansion as the cylindrical insulating envelope, said envelope being made of a ceramic, interposing a brazing material which is Cu alloy or Au alloy excluding Ag between the plates and the envelope,

(b) mounting a bellows made of Fe-Cr alloy on a central portion of said lower end plate through said brazing material,

(c) supporting a movable contact rod, which is made of Cu, at the upper end of said bellows through said brazing material,

(d) mounting a movable electrical contact, which is made of Cu alloy on the upper end of said movable contact rod through said brazing material,

(e) inserting a stationary contact rod, which is made of Cu, in the aperture of said upper end plate through said brazing material,

(f) carrying a stationary electrical contact, which is made of Cu, at the lower end of said contact rod, through said brazing material,

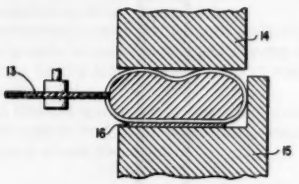
(g) heating said brazing material at a braze temperature range which is between 950° and about 1000° while evacuating at a pressure which is less than 10^{-5}Torr. to 10^{-6}Torr. to melt said brazing material, thereby combining securely and hermetically said assembling components.

4,077,115

METHOD OF MAKING THE SAME ELECTRIC SLIDER

Ferenc Kádár, and Gyula Galambos, both of Budapest, Hungary, assignors to REMIX Radiotechnikai Vallalat, Budapest, Hungary

Division of Ser. No. 622,435, Oct. 14, 1975, Pat. No. 4,050,051.
This application Feb. 18, 1977, Ser. No. 769,926
Int. Cl.[2] H01R *9/16, 43/02*
U.S. Cl. 29—630 B 3 Claims



1. A method of making an electric slider having a plurality of uniformly spaced, independently springing, aligned resilient contact elements, comprising the following steps:

(a) deforming a helix made of a resilient wire of circular cross section and tightly wound on a ductile mandrel; the helix having elongated turns formed of opposite first and second long sides and opposite first and second short sides; said deforming step including

(1) rolling the helix along its length and across the second long side of each turn by a roller having a circularly convex rolling face for flattening the cross section of the second long side of each turn of the helix by providing, as a result of the rolling step, an arcuate depression in the second long side of each turn of the helix;

(2) supporting the helix, simultaneously with the rolling step, at the first long side of each turn;

(b) electrically and mechanically connecting all the adjoining turns of the helix with one another at their first long side;

(c) severing each turn of the helix at said first short side; and

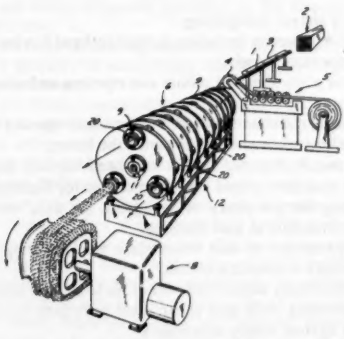
(d) removing the mandrel from the helix.

4,077,116

DEVICE FOR FORMING FINNED HEAT TRANSFER TUBES

Dean Cunningham, Mattoon; Ralph Goeckner; Marlin Alwardt, both of Effingham, and Leon Wohltman, Teutopolis, all of Ill., assignors to Fedders Corporation, Edison, N.J.

Filed Apr. 15, 1977, Ser. No. 787,796
Int. Cl.[2] B21D *53/02;* B23P *15/26*
U.S. Cl. 29—727 3 Claims



1. In a device for forming finned heat transfer tubing, the device being of the type employing a fin structure winding device for winding a fin structure onto a conduit to form a piece of finned heat transfer tubing, a coil winder device for winding the finned heat transfer tubing into a coil, and a support structure operable to support the finned heat transfer tubing while it is being produced and to thereafter supply the heat transfer tubing to the coil winder; the improvement comprising:

at least two substantially parallel and coextensive tubing support means operable to support a piece of finned tubing and being coupled together to form said support structure, said tubing support means being disposed about a central axis equally rotationally spaced apart from each other and said axis whereby rotation of the support structure about said axis will interchange the positions of the support means;

said fin structure winding device having a direction of feed for the conduit substantially parallel to the tubing support means and operable to feed the finned heat transfer tubing formed by the fin structure winding device into one said tubing support means; and

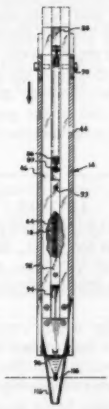
the coil winding means disposed near a second said tubing support means which is rotationally next to said one tubing support means and operable to receive finned tubing from said second support means, for coiling.

4,077,117

HAND TOOL FOR INSERTING ELECTRICAL CONTACTS

John Henry Gavin, Lancaster, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 662,549, Mar. 1, 1976, abandoned. This application Mar. 28, 1977, Ser. No. 782,013
Int. Cl.[2] H05K *3/32*
U.S. Cl. 29—739 5 Claims



1. A hand tool comprising: an elongated body having a longitudinal passage therein for a plurality of discrete electrical contacts and an adjacent channel leading to a restricted outlet through which a contact is inserted into an apertured circuit element; an actuator reciprocably mounted on said body; and a punch slidably mounted in said channel and connected to the actuator for reciprocation therewith in an insertion stroke, said punch having an end configuration adapted to engage and force a contact through said outlet, said channel communicating with said passage for reception of another contact after each insertion stroke.

4,077,118

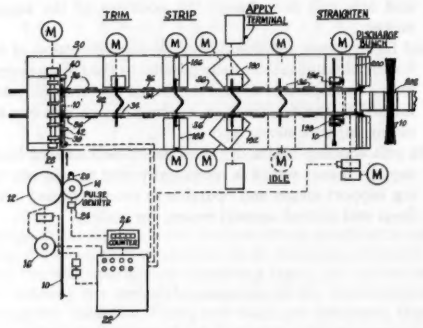
METHOD AND APPARATUS FOR MAKING LENGTHS OF FLEXIBLE MATERIAL

Carl W. McKeever, Kendallville, Ind., assignor to Lyall Electric, Inc., Albion, Ind.

Continuation-in-part of Ser. No. 608,097, Aug. 27, 1975, Pat. No. 3,996,826, which is a division of Ser. No. 493,273, Jul. 31, 1974, abandoned. This application Aug. 11, 1976, Ser. No. 713,363

Int. Cl.[2] B23P *19/04*

U.S. Cl. 29—748 **15 Claims**



1. Apparatus for processing continuous filament material to form predetermined lengths comprising head means defining a channel adapted to receive a continuous length of the material, said channel including a central portion having an arcuate configuration whereby predetermined lengths bow outwardly therefrom, said head means including cutting means positioned to cut the continuous length to the predetermined length, feeding means to intermittently supply the continous length directly to the channel, elongate spaced, parallel conveyor means positioned to receive predetermined lengths from the channel with the predetermined lengths bowed therebetween, said conveyor means including gripping means to carry the predetermined lengths, said head means also including discharge means to supply the predetermined length from the channel to the gripping means, work stations along the conveyor means positioned to receive the predetermined length on sucessive indexing of the conveyor means, said work stations adapted to operate the end of the predetermined length and means to discharge the predetermined lengths from the gripping means.

4,077,119

SHAVING DEVICE

Jose Manuel Sellera, 721 SW. 2 St., Miami, Fla. 33130

Filed Feb. 16, 1977, Ser. No. 769,185

Int. Cl.[2] B26B *21/44*

U.S. Cl. 30—41 **5 Claims**

1. A razor blade holder which comprises an elongate stem having a head end and a holder end and an axially extending longitudinally aligned receptacle open at the terminal end of said holder end, a container of shaving cream under pressure in the container, said container being sized to fit within the receptacle, and means to close the container at said terminal end, said container including a valve and an operator knob to open and close the valve, and said holder having an opening sized for passage of said operator knob, said knob being exteriorly accessible, and said container having a discharge mouth and said holder having a passageway leading to said head end from said discharge mouth, a razor blade carrier means comprising a piece having a first open end and a second open end, said head having a discharge opening and said razor blade carrier means and said head end including mutually intercooperating means to connect and disconnect said razor blade carrier in spanning and covering relation of said discharge opening for passage of shaving cream to the head end of the holder and through the piece and out said second opening, and a razor blade fixed to said carrier and spanning said second opening so that the shaving cream is constrained to pass through the

second opening and around the blade when said valve is operated, said piece and said head end being of an openwork structure defining openings in fluid communication with said passageway.

4,077,120

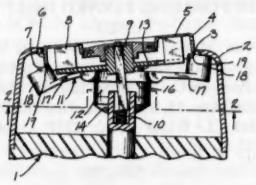
DRY SHAVER WITH FLOATING PERIPHERALLY SUPPORTED SHEAR PLATE

Wallace D. Herrick, Grand Rapids, and Robert A. Yonkers, Grandville, both of Mich., assignors to Bissell, Inc., Grand Rapids, Mich.

Filed Jul. 14, 1972, Ser. No. 271,798

Int. Cl.[2] B26B *19/14, 19/04*

U.S. Cl. 30—43.5 **19 Claims**

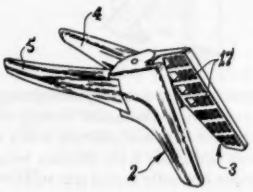


1. A dry shaver comprising:
a. a shaver housing including a shaving head having at least one opening therein,
b. a shear plate disposed within said opening and adapted for tilting relative thereto,
c. a cutting member disposed adjacent said opening beneath said shear plate and tiltable with the latter,
d. and means disposed within said head beneath said shear plate and free of said cutting member for floatingly supporting the periphery of said plate for axial movement therof relative to said opening,
e. the periphery of said shear plate freely resting on said floatingly supporting means,
f. said floatingly supporting means including locking means cooperating with said shear plate periphery to hold the plate against rotary movement.

4. A dry shaver comprising:
a. a shaver housing including a shaving head having at least one opening therein,

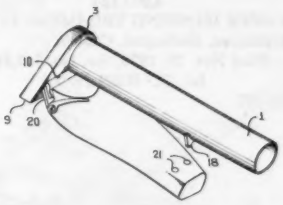
b. a shear plate having a transverse shaving face and with said shear plate being disposed within said opening and adapted for tilting relative thereto,
c. a cutting member disposed adjacent said opening beneath said shear plate and tiltable with the latter,
d. and means disposed within said head beneath said shear plate and free of said cutting member for floatingly supporting the periphery of said plate for axial movement thereof relative to said opening,
e. the periphery of said shear plate freely resting on said floatingly supporting means,
f. said supporting means comprising:
1. a transversely extending support body disposed generally parallel to and beneath said shaving face,
2. means fixedly mounting said support body within said shaving head,
3. and resilient spring means extending horizontally from said support body and supportingly engaging the periphery of said shear plate.

4,077,121
NUT CRACKER
Campbell Ernst Waller, Eltham, Australia, assignor to Wiltshire Cutlery Company Proprietary Ltd., Victoria, Australia
Filed May 3, 1976, Ser. No. 682,782
Claims priority, application Australia, May 5, 1975, 1482/75
Int. Cl.[2] A47J *43/26;* B26B *17/00*
U.S. Cl. 30—120.3 **8 Claims**



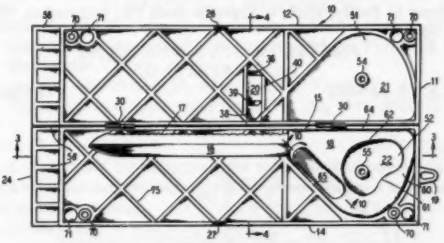
1. A nut cracker including;
a pair of elongate handles, a pivotal connection having a pivot axis pivotally connecting said handles together for movement towards and away from each other, said handles extending generally transverse to the pivot axis of said pivotal connection;
a pair of plate-like jaws, each jaw having a broad surface forming a working face which is disposed in opposed facing relationship to the corresponding working face of the other jaw, and said working faces diverging generally in the direction of said pivot axis and defining a wedge-shaped crushing space between them;
each jaw being elongated generally in the direction of said pivot axis;
each working face being substantially flat and being defined by a plurality of intersecting ribs having pockets formed therebetween;
each jaw being connected to a respective one of said handles so that movement of the handles towards and away from each other causes corresponding movement of said jaws about said pivot axis such that the size of said crushing space is reduced and increased respectively;
each jaw having a longitudinal axis extending generally transverse to that of the respective handle and diverging relative to said pivot axis in a direction from said handle towards a wider end of said wedge-shaped crushing space;
first and second stop means respectively operarive to limit the extent to which said handles can be moved towards and away from each other and thereby determine the minimum and maximum size of said crushing space;
and spring means acting between said handles and urging said handles apart.

4,077,122
HAIR CUTTING AND TRIMMING APPARATUS
Edward A. Rollor, Jr., 658 Wisteria Dr., and Clarence H. Hunt, 591 Hillandal Cir., both of Marietta, Ga. 30064
Filed Feb. 11, 1977, Ser. No. 767,983
Int. Cl.[2] B26B *19/20, 19/44*
U.S. Cl. 30—133 **11 Claims**



1. Apparatus for use in cutting and trimming hair comprising a body member having a hollow handle portion and a hollow head member having a slotted inflow opening, said head member extending from said handle portion at an angle in the range of 90° to 120°, the hollow interiors of said handle portion and said head member being in flow communication, said handle being adapted to connect to a source of vacuum to draw air into said slotted inflow opening through said head member and handle portion, said head member having a cutting opening defined therein to permit hair which is drawn into said inflow opening to be cut at said cutting opening by cutter blades inserted into said cutting opening from a cutter located outside said apparatus, said apparatus further comprising: baffle means, located slightly downstream of said cutting opening, for forcing said hair transversely toward said cutting opening; and means for securing an electric clipper to said apparatus with the blades of said clipper extending into said head member through said cutter opening.

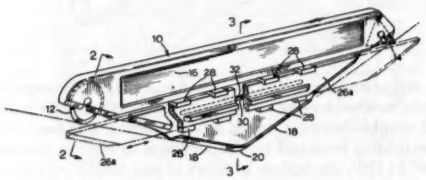
4,077,123
KNIFE FOR A FLAT CUTTING SURFACE
Samuel J. Popeil, and Lorenzo Anthony Ruiz, both of Chicago, Ill., assignors to Popeil Brothers, Inc., Chicago, Ill.
Division of Ser. No. 683,479, May 5, 1976, Pat. No. 4,015,330.
This application Dec. 13, 1976, Ser. No. 749,607
Int. Cl.[2] B26B *3/02*
U.S. Cl. 30—286 **7 Claims**



1. A knife to be used in combination with a flat cutting surface comprising:
a blade portion;
a handle portion integrally connected to said blade portion;
a flat base on said handle portion;
said flat base in parallel relation to the knife cutting edge, whereby said knife can cuttingly engage in parallel relationship the flat cutting surface;
said handle portion having a closed central grip portion;
said closed central grip portion having an elongated configuration with its longitudinal axis forming an acute angle

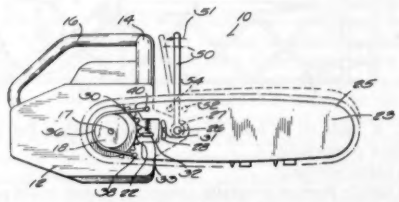
with the longitudinal axis of said blade, one end of said grip portion disposed adjacent to the intersection of said flat base and the side of said handle portion opposite the side connected to said blade portion, whereby said alignment of said central grip portion provides a grip capable of transferring a sizeable torque to the blade portion.

4,077,124
PAPER HANGING TRIMMING TOOL
Norbert Christmann, Burlington, Canada
Filed Nov. 29, 1976, Ser. No. 745,818
Int. Cl.[2] B26B *29/00*
U.S. Cl. 30—287 **7 Claims**



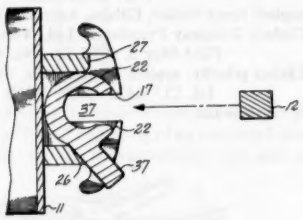
1. A handtool for the application of sheet material to a surface comprising:
- a thin body of obtuse angle triangle shape in side elevation, having an obtuse-angled tip apex opposite to a base side thereof, and having respective base apices opposite to its other two sides, the body being adapted to be grasped adjacent its base side by the hand of an operator;
- the tip apex of the body being rounded for folding engagement thereof with the sheet material;
- a first circular knife blade rotatably mounted at one of the base apexes with its circular cutting edge aligned with the adjacent other side;
- and a second straight-edge knife blade mounted at the other base apex with its straight cutting edge aligned with the adjacent other side;
- each of said two other body sides having a straight portion thereof cooperating with the respective knife blade, whereby with the said body side straight portion in contact with the sheet material the respective knife blade cutting edge cuts into the sheet material and is guided by the straight portion in a cut coextensive therewith as the handtool is moved by the operator over the sheet material.

4,077,125
AUTOMATIC SAFETY BRAKE FOR CHAIN SAW
Henry C. Fuller, 9529 N. Apple Blossom La., Milwaukee, Wis. 53217
Filed Feb. 18, 1977, Ser. No. 769,983
Int. Cl.[2] B27G *19/00*
U.S. Cl. 30—382 **10 Claims**



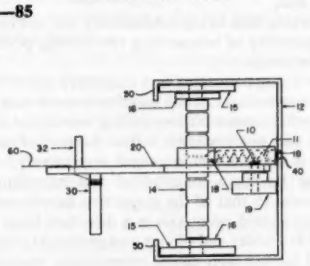
1. A chain saw including a frame, a motor with an output shaft, a cutting chain, a cutter bar for guiding said chain, a sprocket on said cutput shaft for driving said cutting chain, pivot means for pivotally mounting said cutter bar to said frame to afford movement between a forward safety position and a rearwardly displaced cutting position, means for biasing said cutting bar to said forward safety position, and said cutter bar being displaceable to said cutting position to overcome the bias of said biasing means and about said pivot means when said cutter bar is pressed against work material for cutting action, brake means associated with said sprocket for stopping movement of said sprocket and said cutting chain, means connecting said brake means to said cutter bar to actuate said brake means to stop chain movement when said cutter bar is pivoted to said safety position by said biasing means upon release of said cutter bar from the work material and said brake means being released upon rearward pivotal movement of said cutter bar to said cutting position as said cutter bar is pressed against the work.

4,077,126
ORTHODONTIC BRACKET
Erwin C. Pletcher, P.O. Box 566, Rancho Santa Fe, Calif. 92067
Filed Jul. 6, 1976, Ser. No. 703,082
Int. Cl.[2] A61C *7/00*
U.S. Cl. 32—14 A **14 Claims**



1. An orthodontic bracket assembly comprising:
- a bracket member having a base, and having a body portion extending from the base and defining a slot to receive an elongated arch wire, the body portion being hollow to define an arcuate inwardly facing seat surface adjacent the bracket-body slot; and
- a hollow locking member rotatably positioned within the bracket body portion against the seat surface, the locking member defining a slot which is alignable with the bracket-body slot so the arch wire can be received in both slots and the locking member can then be rotated about a longitudinal axis of the arch wire to misalign the slots and make the arch wire captive within the lock member, thereby locking the arch wire to the bracket member.

4,077,127
MECHANICAL CORNER SYSTEM FOR BRICKMASONS
William Edsel Herrington, P.O. Box 26, Sumrall, Miss. 39482
Filed Jun. 8, 1976, Ser. No. 693,856
Int. Cl.[2] G01C *15/10*
U.S. Cl. 33—85 **1 Claim**



1. A mechanical corner system comprising: A pair, left and right, of vertically elongated channel members used as primary poles each of said channel members having short flanges inturned on each side of the face thereof, said channel members

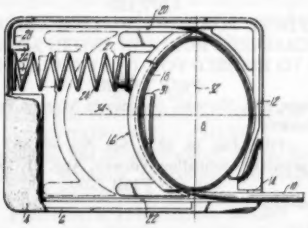
each having a plurality of vertical rows of holes in the back walls of said channel members each row of said vertical rows of holes corresponding, center to center, to selected brick course spacing, said vertical rows of holes being left to right in one channel members and right to left in opposing channel members, said channels having lower adjusting brackets attached to each channel members at the lower end, and upper adjusting brackets attached to each channel members at the upper end, said upper adjusting brackets having grooves in the front edge of top plate of said upper adjusting brackets, said grooves corresponding to each row of said vertical rows of holes of said channel members, said upper adjusting brackets having adjustable arms attached and extended from the front edge of said top plate of said upper adjusting brackets for attachment to a previously built wall, a pair, left and right, of line holding members, said means including a shaft having circumferential grooves therein corresponding to the vertical rows of holes in said channel members, said shaft having roller means thereon for engaging said short inturned flanges and said line holding members having a rear portion mounting roller means for engaging the rear wall of the channel member, said line holding members including means for movably mounting same along said shaft and said rear portion also carrying spring pressed pin means for engaging a selected one of said holes in said channel members and a corresponding groove in said shaft.

4,077,128

COILABLE TAPE RULE

Carl Christian Stoutenberg, Avon, Conn., assignor to The Stanley Works, New Britain, Conn.

Filed Mar. 8, 1976, Ser. No. 664,864
Int. Cl.² G01B 3/10
U.S. Cl. 33—138 **5 Claims**



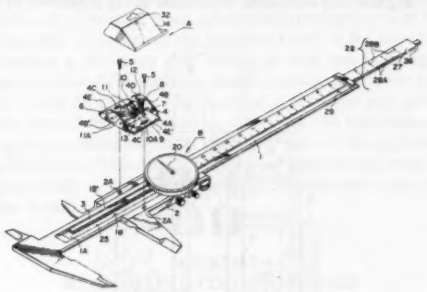
1. A coilable tape rule comprising a casing providing an expandable chamber, and a removable metal tape blade therein, said tape having a concavo-convex cross-section and of the type having a strong force compelling it to assume a straight line position the front wall of said casing having a slot for receiving said tape blade and providing an arcuate inner surface, a guide shoe mounted in said casing for sliding movement toward and away from said arcuate inner surface, said guide shoe presenting an arcuate surface of substantially the same curvature as said inner surface of said front wall biasing means for urging said guide shoe toward said inner surface to a first position to a generally elliptical chamber having its major axis in a first direction to coil the initial convolution of the tape blade stored in said chamber into a corresponding first elliptical shape, said guide shoe being movable away from said front wall a sufficient distance to a second position as the tape blade is being coiled into said chamber to convert said chamber into an elliptical chamber having its major axis substantially perpendicular to said first direction.

4,077,129

PORTABLE, LIGHTWEIGHT MEASURING INSTRUMENT

Goro Nishikata, Kawasaki, Japan, assignor to Kabushiki Kaisha Mitutoyo Seisakusho, Tokyo, Japan

Filed Sep. 7, 1976, Ser. No. 720,699
Claims priority, application Japan, Dec. 29, 1975, 50/178780
Int. Cl.² G01B 5/02
U.S. Cl. 33—147 T **10 Claims**



1. A portable, lightweight measuring instrument comprising:
   a. a main beam;
   b. a slider mounted to slide longitudinally of said main beam;
   c. a rack extending longitudinally along said main beam;
   d. a dial gauge attached to said slider, said dial gauge having a pointer driven by a first pinion meshing with said rack to indicate a portion of the displacement of said slider relative to said main beam, said dial gauge including dial means rotatable relative to the pointer for adjusting the dial gauge to zero; and
   e. a counter separate from said dial gauge attached to said slider and driven by a second pinion meshing with said rack to indicate an additional portion of the displacement of the slider relative to the beam, so that the total displacement of the slider is indicated by the dial gauge and counter, said counter being attached to said slider for zero adjustment by means attaching the counter to the slider for longitudinal adjustment with respect to the slider.

4,077,130

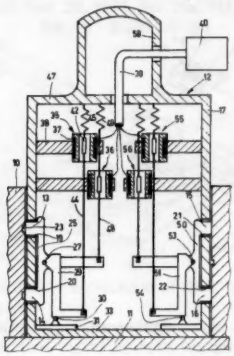
APPARATUS FOR MEASURING THE TAPER AND THE OUT-OF-ROUNDNESS OF A REVOLUTIONARY SURFACE OF A WORKPIECE

Mario Possati, Bologna, Italy, assignor to Finike Italiana Marposs, Soc. In Accomandita Semplice di Mario Possati & C., Bentivoglio, Italy

Filed Oct. 28, 1976, Ser. No. 736,464
Claims priority, application Italy, Nov. 13, 1975, 3584/75
Int. Cl.² G01B 7/12, 7/30
U.S. Cl. 33—174 L **6 Claims**

1. Apparatus for measuring the taper and out-of-roundness of a revolutionary surface of a workpiece defining a longitudinal axis, comprising:
   a frame; and
   measuring means carried by the frame, including: a support; two feelers fixed to the support for cooperating with two points of different cross-sections of the revolutionary surface; connection means for coupling the support to the frame, the connection means including: a level; first pivoting means for coupling the support to the lever, said first pivoting means permitting angular displacements of the support substantially in a longitudinal axial plane relative to the workpiece; second pivoting means for coupling the lever to the frame, said second pivoting means permitting displacements of the lever and the support, the relevant displacements of the support occurring substantially along

a radial direction relative to the workpiece; and transducer means for providing signals responsive to the position of said support, the transducer means comprising a first transducer including a first movable element, a first wire connecting the movable element to said support, first spring means for tensioning the wire and maintaining it substantially parallel to said longitudinal axis, and first circuit means for providing a signal responsive to said angular displacements, this signal being indicative of the



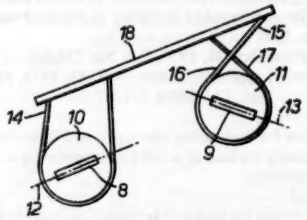
taper of the revolutionary surface, and a second transducer including a second movable element, a second wire connecting the second movable element to said lever, second spring means for tensioning the second wire and maintaining it substantially parallel to said longitudinal axis, and second circuit means for providing a signal responsive to said displacements of the lever, this signal being indicative of the out-of-roundness of the revolutionary surface.

4,077,131

MAGNETIC COMPASS ARRANGEMENTS

Frederick Brian McKee, Burnham-on-Crouch, England, assignor to The Marconi Company Limited, England

Filed Jul. 20, 1976, Ser. No. 707,009
Int. Cl.[2] G01C *17/18, 17/26, 17/38*
U.S. Cl. 33—356 **4 Claims**



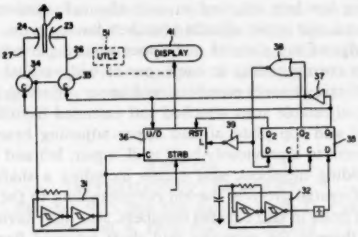
1. A magnetic compass arrangement including two compass cards, means separately mounting said compass cards to a common support member for producing equal and opposite tilting movements of said compass cards in response to an overall tilt imposed on the magnetic compass arrangement, such that the bearing errors due to tilt of each are substantially equal and opposite, and means for sensing the bearing of each compass card and producing an output related thereto, and means for combining the outputs of said sensing means to produce an output substantially eliminating said errors.

4,077,132

DIGITAL LEVEL INDICATOR

Kent E. Erickson, Brookside, N.J., assignor to Keuffel & Esser Company, Morristown, N.J.

Filed Feb. 22, 1977, Ser. No. 770,951
Int. Cl.[2] G01C *9/06*
U.S. Cl. 33—366 **8 Claims**



1. A level indicator comprising:

a. a capacitive level sensor comprising a pair of capacitors including a common, pendulously-suspended plate member;

b. means forming an oscillator circuit with a capacitor of said sensor;

c. means for regularly, alternately placing one and the other of said sensor capacitors in said oscillator circuit;

d. means in circuit with the output of said oscillator circuit for accumulating counts of the output of said oscillator circuit effected during the respective periods of incorporation of each said sensor capacitor in said circuit and for determining the difference between the respective counts so accumulated; and

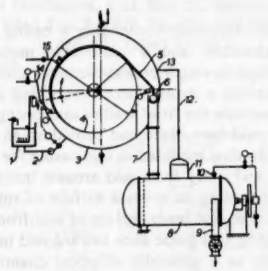
e. means utilizing said count difference to provide a response indicative of the extent of departure of said sensor from a level attitude.

4,077,133

PROCEDURE FOR DEHYDRATING AND DRYING FINE-GRAINED PRODUCTS AND IN ADDITION A DEVICE TO BE USED FOR THE EXECUTION OF THE PROCEDURE

Per A. Løken, Ski, Norway, assignor to Myrens Verksted A/S, Oslo, Norway

Filed Jun. 16, 1976, Ser. No. 696,632
Claims priority, application Norway, Aug. 21, 1975, 752903
Int. Cl.[2] F26B *7/00*
U.S. Cl. 34—17 **7 Claims**



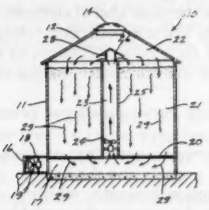
1. A method of dehydrating and drying fine grained products initially present in slurry form comprising the steps of: passing the fine-grained products into a pressure filter, providing a pressure difference across the filter to form a filter cake of the products on the filter, passing the filter cake into a contact dryer, communicating the exhaust steam from the

contact dryer to the pressure side of the filter for passage through the filter cake and filter, and maintaining a substantially identical pressure in the contact dryer and on the high pressure side of the pressure filter by maintaining open communication between the pressure filter and the contact dryer.

4,077,134
METHOD AND STRUCTURE FOR OPTIMIZING ATMOSPHERIC ENVIRONMENT TO PRESERVE STORED FOOD GRAINS IN THE CURING AND POST CURING STATE

Sylvester L. Steffen, R.R. 3, New Hampton, Iowa 50659

Filed Jul. 14, 1976, Ser. No. 704,996
Int. Cl.² F26B *3/00*
U.S. Cl. 34—22 **12 Claims**



10. A method of maintaining approximately uniform grain moisture content throughout a mass of stored grain within a grain storage chamber of a grain bin while preventing the overdrying of the stored grain, said method comprising:

substantially preventing the introduction of atmospheric air into the grain bin;

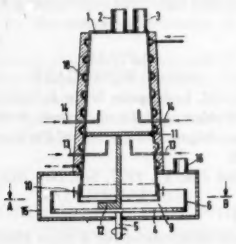
substantially preventing the exhaust of air from the grain bin to the atmosphere; and

activating an internal ventilation fan, said fan being attached to and disposed within the lower portion of a vertically disposed plenum chamber having perforate walls, the outer surface of said perforate walls being in contact with the stored grain, said activation forcing air to pass through said vertical chamber and ventilate the stored grain while circulating within the closed grain bin.

4,077,135
APPARATUS FOR THE MANUFACTURE OF VINYL CHLORIDE POLYMERS

Eberhard Tzschoppe, and Jürgen Weinlich, both of Burgkirchen, Alz, Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Mar. 8, 1976, Ser. No. 664,889
Claims priority, application Germany, Mar. 7, 1975, 2509937
Int. Cl.² F26B *17/00*
U.S. Cl. 34—57 R **11 Claims**

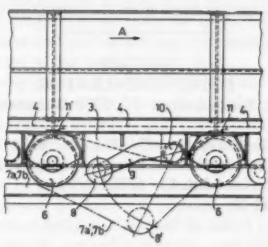


1. In an apparatus for removing a residual monomer from a vinyl chloride polymer containing at least 75% by weight of vinyl chloride units and having a water content of from about 5 to 35% by weight by treatment of the vinyl chloride polymer with steam, the apparatus comprising a truncated conical vessel having a vertical axis and lower to upper surface areas in the range of about 4:1 to about 9:8, the top of the vessel being substantially closed and the bottom being substantially open, at least one outlet in the top for passing gaseous substances through it, at least one inlet in the top for supplying solids, a horizontally disposed turntable disposed adjacent and under the open bottom of the vessel with a space therebetween, the turntable having a peripheral outer wall disposed laterally outside the bottom of the vessel, the turntable having a vertical central axis of rotation being substantially concentric with the vertical axis of the vessel, the peripheral wall of the turntable comprising a stationary ring having at least one opening, a stationary flow-directing vane means mounted in a lower part of the vessel for diverting the material in the lower part of the vessel toward the outer wall of the vessel, the improvement comprising conduit means in the lower part of the apparatus disposed above the turntable for blowing gaseous substances in a substantially uniform pattern through the cross sectional area of the vessel.

4,077,136
RING SHAPED COOLING DEVICE

Johannes Lorrek, Mulheim (Ruhr), and Josef Lorrek, Essen, both of Germany, assignors to Krupp-Koppers GmbH, Essen, Germany

Filed Sep. 27, 1976, Ser. No. 727,217
Claims priority, application Germany, Oct. 25, 1975, 2547882
Int. Cl.² F26B *19/00*
U.S. Cl. 34—62 **6 Claims**



6. A ring shaped cooling device for cooling hot particulate material comprising an annular frame having an outer and an inner annular wall connected to each other and defining an annular space therebetween; a plurality of wheels located circumferentially spaced from each other outside said space and rotatably mounted on said outer and said inner annular wall, respectively; a pluraility of carriages for carrying the material to be cooled located adjacent each other in said space; a lever fixedly connected at one end to each of said carriages outside said frame; a roller follower turnably mounted on the other end of each lever; a pair of guide rails respectively supporting the plurality of wheels which are rotatably mounted on said outer and said inner wall of said frame, said guide rails being also engaged by said roller followers, each of said guide rails having at a zone for unloading said carriages downwardly curving portions so that during riding of said roller follower over said downwardly curving portions the respective carriages will tilt to thereby discharge the material therefrom.

4,077,137
GRAPHIC ARTS FILM DRYER

Donald C. Edgington, and William E. Edgington, both of 2425 N. Ashland Ave., Chicago, Ill. 60614

Filed Feb. 18, 1976, Ser. No. 659,005
Int. Cl.² F26B *19/00*
U.S. Cl. 34—70 **20 Claims**

1. A film dryer comprising

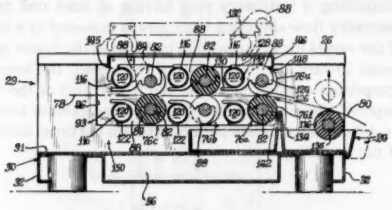
a frame having boxes at the sides thereof defining chambers therein,

a roller assembly mounted on the frame between the said boxes and including rollers for feeding a film through the roller assembly and squeegeeing water from the film,

means for driving the squeegee rollers, mounted in one of said chambers,

means for producing an air stream,

conduit means in the roller assembly for receiving air from said air stream and directing it onto a film in the roller assembly,



the air stream producing means being mounted in another of said chambers,

the dryer including a conduit on the underside of the frame communicating between the chambers for conducting air from one of the chambers to the other,

the arrangement thereby including air spaces of substantial volume on three sides, namely the opposite sides of the dryer and under the frame, whereby to provide substantial insulation against noise from the operation of the dryer.

4,077,138

DRIVING SIMULATOR

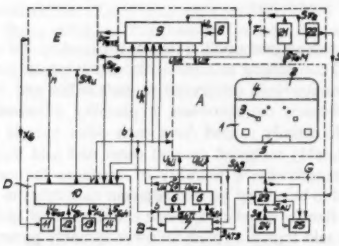
Reiner Foerst, Bickenbachstr 57, 5270 Gummersbach 7, Germany

Filed May 13, 1976, Ser. No. 686,113

Claims priority, application Germany, May 13, 1975, 2521103

Int. Cl.[2] G09B 9/04

U.S. Cl. 35—11 R **14 Claims**



1. A device for the simulation of a car ride on a plane curved road laterally limited by an enclosure using a monitor for the picture of the road perspectively observed by the driver, the monitor being provided for the generation of the road picture, as well as using control devices such as accelerator pedal, brake pedal, clutch pedal, and steering wheel, and means for providing signals responsive to the various control devices, which devices influence the road picture, as well as using sound generating devices, comprising in combination:

several video signal generators by each of which one phase- and length-controlled vertical pulse and two phase- and length-controlled horizontal pulses for the brightening of one light spot pair are generated,

means for generating a speed signal,

a deflection voltage generator which is controlled by a speed-proportional pulse generator, which comprises an evaluation matrice having sections, means for switching the evaluation matrice in sections and fed by the speed signal, and which generates periodical voltages being composed of linear time sections for the horizontal and vertical shifting and for the width and height alternation of said light spots,

a computing device for the computation of said speed signal, simulating a decreasing rotation - torque characteristic and supplying not only the speed signal but also the signal for the engine rotation, the clutch gripping or not gripping,

means for programming a digital curve sequence generator,

phase locking means and video signal generators,

several standard curve function generators, which generate a sequence of curves on triggering by a digital curve sequence program generator being phase locked to said deflection voltage generator, which curve function generators comprise the same kind of elements and are functioning in principle like said deflection voltage generator, and which supply their output voltages to said video signal generators for the horizontal shifting of said light spot pairs,

means connecting curve functional generators to system features,

means for determining curvature of road, track angle and parallel track position and the like,

a curvature function generator which is controlled by the same signals and comprises the same kind of elements and is functioning in principle like said curve function generators, and which generates an additional voltage being proportional to the curvature of the road,

a subtraction device by which said additional voltage is subtracted from a voltage proportional to the angle of the steering wheel,

a horizontal shifting control device to which the output of said subtraction device is supplied for influencing the picture according to deviations of the track angle and the parallel track position.

14. A device for the generation of an obstacle including in combination

means to generate one light spot and deflection voltage means,

means for generating the light spot representing the car front,

video signal generator means by which the light spot for an obstacle is generated in the middle of one light spot pair and which is controlled by the deflection voltages of this light spot pair, the deflection lasting only one period of the light spot sequence,

an obstacle sequence program generator means releasing the obstacle light spot with irregular distances and functioning like a curve sequence program generator, and

an obstacle error measuring device supplying an obstacle error signal provided so that the speed of the car exceeds an adjustable minimum value as soon as the obstacle light spot touches the light spot representing the car front.

4,077,139

SNOW WING GATE

Leroy W. Fagervold, Lodgepole; Irwin J. Solomon, Rocky Rapids; Edward Webber, and Jacob Troudt, both of Stony Plain, all of Canada, assignors to County of Parkland No. 31, Stony Plain, Canada

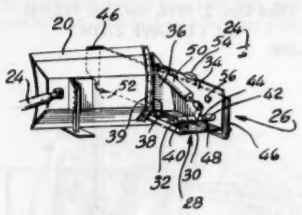
Filed Jan. 17, 1977, Ser. No. 760,168

Int. Cl.[2] E01H 5/00

U.S. Cl. 37—41 **4 Claims**

1. A snow gate attachment for a plow blade provided on a vehicle comprising a frame, bracket means mounted on the frame for securing the frame to the free end of a plow blade, a gate member pivotally mounted to the frame, actuating means positively actuating the pivoting movement of the gate member between a first position and a second position whereby the gate member, when in the first position, will be in a horizontal position when mounted with a plow blade and extending for-

ward of the blade to block the discharge of snow from the plow blade, the gate member being pivotable in a vertical plane parallel to the axis of the vehicle on which the plow blade is



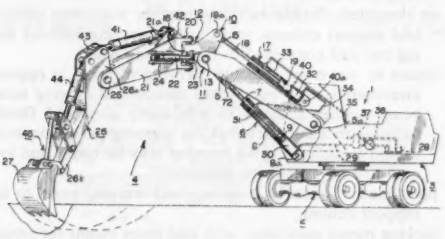
mounted for trapping snow, and a second position whereby the gate member will be clear thereof and allowing the snow to be discharged from the plow blade, the frame and gate member being mounted rearwardly of the plow blade.

4,077,140

HYDRAULIC EXCAVATOR EQUIPMENT FOR EXCAVATION LATERALLY OF THE EXCAVATOR

Marcello Branconi, Turin, Italy, assignor to Societa Italiana Macchine Industriali Torino, S.p.A., Grugliasco (Turin), Italy

Filed Mar. 23, 1977, Ser. No. 780,527
Claims priority, application Italy, Mar. 31, 1976, 67751 A/76
Int. Cl.[2] E02F *5/02*
U.S. Cl. 37—103 **9 Claims**



1. An excavator supported on a work plane for effecting excavations parallel to and laterally spaced from the longitudinal axis of the excavator comprising

a lift arm supported at one end on an excavator base positioned parallel to a work plane for pivotal movement in a plane normal to the excavator work plane,

said lift arm including a coupling portion supported at an opposite end for rotational movement within the plane of movement of said lift arm,

material excavating means operatively connected to said coupling portion for movement in a path of movement determined by the rotational position of said coupling portion, and

means for effecting rotational movement of said coupling portion in direct response to movement of said lift arm for maintaining the path of movement of said excavating means within a plane normal to the excavator work plane throughout varying pivotal positions of said lift arm.

4,077,141

TIRE PROTECTOR ASSEMBLY FOR A WHEEL LOADER

Robert N. Stedman, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 8, 1976, Ser. No. 721,656
Int. Cl.[2] E02F *3/76*
U.S. Cl. 37—117.5 **13 Claims**

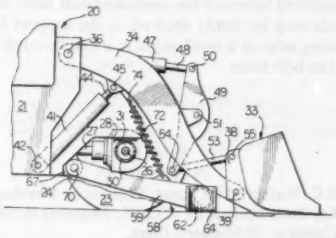
1. A wheel loader comprising:

a frame;

a plurality of wheels for supporting said frame and effecting travel thereof over the ground including a pair of front wheels one on each lateral side of said frame, said front wheels defining a lateral wheel span;

a pair of lift arms one on each lateral side of said frame so as to flank said frame, each lift arm having its rearward end pivotally secured to the frame rearwardly of said front wheels, said lift arms extending forwardly therefrom between said frame and their respective front wheels;

a bucket extending between and pivotally secured to said lift arms at the forward ends thereof remote from their pivotal connection to said frame, the lateral width of said bucket being less than the lateral wheel span, pivotal motion of said lift arm moving said bucket between a lowered digging position forward of the frame and wheels adjacent the ground and a raised transporting position above the ground;



deflector means located forwardly of said front wheels for deflecting material away from the front wheels, said deflector means and said bucket together spanning a width at least as great as the lateral wheel span;

means movably mounting said deflector means to the loader for movement between a lowered operative position adjacent the ground forward of the front wheels and a raised inoperative position remote from the ground; and

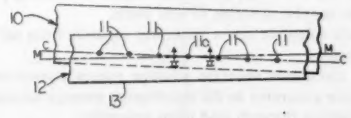
means for moving said deflector means solely in response to movement of said bucket so that said deflector means is moved toward its lowered position as said bucket is moved downwardly, and toward its raised position as the bucket is moved upwardly, whereby said deflector means and said bucket, when lowered, are operative to clear a path through which the wheels move at least as wide as the lateral wheel span so as to prevent damage to the wheels of the wheel loader.

4,077,142

ADJUSTABLE CUTTING EDGE ASSEMBLY FOR A POWER EARTH MOVER

Gene R. Klett, and Warner G. Richardson, both of Joliet, Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 23, 1977, Ser. No. 780,554
Int. Cl.[2] E02F *9/28*
U.S. Cl. 37—141 R **12 Claims**



1. An adjustable cutting edge assembly for the scraper bowl of a power earth mover which has a transverse support bar at its forward margin provided with a plurality of bolt holes at predetermined intervals along its length, said assembly comprising, in combination:

a blade with a forward cutting edge which extends substantially from end to end of said support bar, said cutting

blade having a plurality of round mounting holes each of which is associated and in register with one of said bolt holes, said mounting holes being substantially larger in diameter than are the bolt holes;

first disc means rotatably mounted in one of said mounting holes, said first disc means having a bore the axis of which is concentric in the mounting hole and in register with the associated bolt hole;

a pivot hole in said bore and said associated bolt hole providing an axis for pivoting the cutting blade on the support bar;

second disc means rotatably mounted in another of said mounting holes, said second disc means having a bore the axis of which is eccentric in the mounting hole and in register with the associated bolt hole;

and an orienting bolt extending through the eccentrically positioned bore and the associated bolt hole, whereby the blade may be firmly secured to the support bar with its cutting edge at a small angle to a line through the centers of the bolt holes.

4,077,143

STEAM IRON

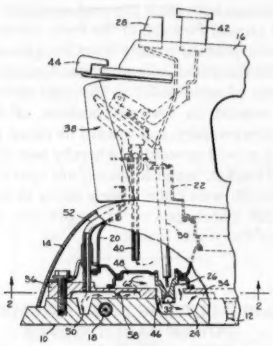
Wendell C. Walker, Alta Loma; William E. Davidson, Ontario, and Kaj Toft, Upland, all of Calif., assignors to General Electric Company, Bridgeport, Conn.

Continuation of Ser. No. 424,570, Dec. 13, 1973, abandoned. This application Nov. 26, 1974, Ser. No. 527,210

The portion of the term of this patent subsequent to Mar. 25, 1992, has been disclaimed.

Int. Cl.[2] D06F *75/06*

U.S. Cl. 38—77.83 **7 Claims**



1. In a steam iron having an interior water tank and a steam generating soleplate with ports therein, the improvemen in steam generating capacity comprising:

a main flash soleplate generator fed by a metering water valve and directly connected to first distributing passage means supplying steam to said ports,

a separate soleplate steam generator separate from said main generator,

second circuitous separate passage means connecting the separate generator to the distributing passage means without passing through said main generator,

restrictive means in said circuitous passage directing steam and water towards the soleplate,

pump means operative to selectively inject water into the separate generator where it completely flashes into steam in the circuitous passage and then enters the distributing passage to exit said ports, and said separate generator and circuitous passage means being disposed inboard of said first passage means.

4,077,144

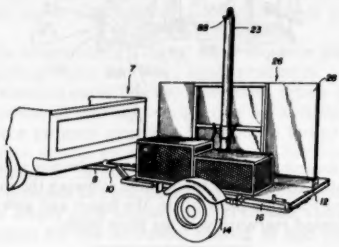
TRAILER WARNING PANEL ASSEMBLY

Willem C. Smits, Elgin, Ill., assignor to Beatrice Foods, Chicago, Ill.

Filed Oct. 3, 1974, Ser. No. 511,924

Int. Cl.[2] G09F *21/04*

U.S. Cl. 40—590 **7 Claims**



1. A trailer warning panel having a platform with opposite side mounted wheels in a warning panel with a plurality of discreet electrical image display means, including

a support column extending upwardly from said platform,

spaced rotary means mounted on said column support, one being an upper rotary means and the other being a lower rotary means adjacent a platform,

said upper rotary means being pivotally mounted to said support column,

an elongated, flexible carrying member positioned adjacent said support column, said flexible carrying member having one end connected to the warning panel,

means to move said flexible carrying member in opposite directions around said rotary means, said moving means being further adapted to selectively stop said flexible carrying member such that the warning panel connected to said flexible carrying member may be raised and lowered to any preselected position,

pivot means rotatably mounting said warning panel to said support column,

locking means associated with said pivot means for permitting the locking engagement of said pivot means in any preselected rotated position relative to said support column,

said pivot means and locking means thereby permitting the flexible carrying member and warning panel connected thereto to be raised and lowered along the length of said support column, and to also permit the selective rotation of the warning panel such that the warning panel may be raised to any desired height and rotated to any desired angle and lockingly engaged in position,

and means to hold the warning panel on the platform, said holding means comprising an elongated seat mounted on the platform, the long axis of said seat being substantially parallel to the opposite sides of the trailer whereby the plane of the warning panel when stored in the elongated seat is turned in the direction of trailer travel.

4,077,145

NUMBER PLATES FOR RACING VEHICLES

Frank E. Smoczynski, 101 E. Oak-Glen Dr., Bartlett, Ill. 60103

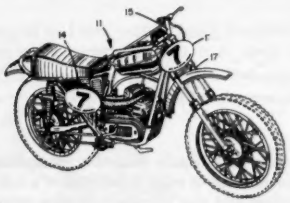
Continuation-in-part of Ser. No. 568,459, Apr. 16, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,084

Int. Cl.[2] G09F *21/04*

U.S. Cl. 40—590 **19 Claims**

1. A number plate for racing two wheeled vehicles comprising base material means having first and second sides, first color means substantially entirely covering said first side, second color means substantially entirely covering said second side, said second color means being a different color than said first color means, and overlaminate material means applied to

said first and second sides for providing a protective sealing surface for said first and second color means and for providing surfaces to which identifying numbers can be positively secured by adhesion, said overlaminate material means being transparent to permit viewing of said first and second color means therethrough, wherein said number plate is flexible to



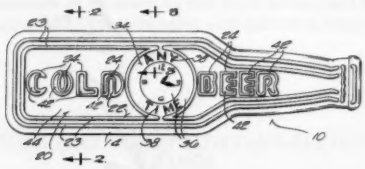
flex appreciably when subjected to wind force to thereby lessen the effect of wind resistance produced by said number plate, wherein said base material means comprises high impact sheet material means, and whereby said number plate is attachable to a two wheeled vehicle with said first side visible to designate a particular racing class and reversible with said second side visible to designate another racing class.

4,077,146

SIMULATED NEON DISPLAY DEVICE

Donald D. Nasgowitz, Milwaukee, Wis., assignor to Display Corporation International, Milwaukee, Wis.

Filed Sep. 22, 1976, Ser. No. 725,488
Int. Cl.[2] G09F *13/08*
U.S. Cl. 40—564 **1 Claim**



1. A display device comprising:

a body including a display member having a peripheral edge defining a given shape, said body including wall means connected to said peripheral edge for defining an enclosed area,

said display member having a generally opaque portion, and also having raised elongated generally transparent portions forming a first pattern outlining said peripheral edge defining said given shape and a second pattern associated with said first pattern and with said opaque portion and conforming to a predetermined outline of indicia,

a light source located within said enclosed area and secured to said body and associated with said raised elongated transparent portions to direct light therethrough,

said display member comprising a generally transparent material including a first surface and an opposite second surface, wherein said raised elongated transparent portions are convex and are formed within said transparent material, said display member also comprising a colored transparent paint secured to said first surface coincident with said convex raised transparent portions, and a generally opaque material secured to said first surface exclusive of said convex raised transparent portions for defining said display member opaque portion, whereby said display member is adapted to provide the general visual effect of a neon sign when said convex raised elongated transparent portions are illuminated by light from said light source directed against said second surface of said transparent material,

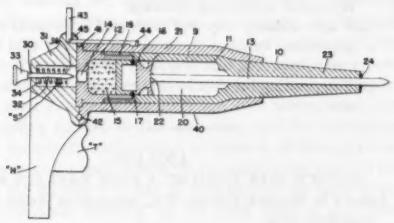
said generally opaque material further defining a design portion of said opaque portion having a translucent visual effect, said opaque material defining said design portion comprising a first opaque paint secured to said first surface and conforming to the design having open areas, and also comprising a second opaque paint secured to said second surface opposite said open area of said design, said first and second opaque paints comprising different colors so that said design portion has a translucent visual effect.

4,077,147

UNDERWATER SIDE ARM

Reed E. Donnard, 417 Emerson Rd., Huntingdon Valley, Pa. 19006, and Edward R. Hirsekorn, 3111 Brighton St., Philadelphia, Pa. 19149

Filed Jan. 26, 1962, Ser. No. 169,153
Int. Cl.[2] F41C *3/00*; **F42B** *5/00*
U.S. Cl. 42—1 L **8 Claims**



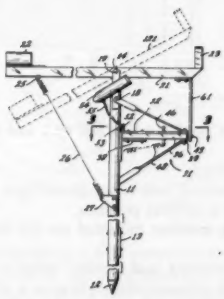
1. A device including an expendable cartridge-barrel assembly comprising a cartridge casing forming a barrel, the wall thickness of said barrel being at least equal to about the diameter of the bore therein, a retainer affixed to and rearwardly of said casing, a high energy propellant enclosed within said assembly, a primer within said retainer and communicating with said propellant, a projectile frictionally fitted within and extending along the bore of said barrel and having a rear end in proximate relation to said propellant, said projectile being designed for high sectional density and minimum drag with water, and a watertight seal affixed to a front end of said cartridge-barrel assembly.

4,077,148

FISHING ROD HOLDER

Jesse Carey, 2014 N. Keen Ave., Los Angeles, Calif. 90059

Filed Jun. 17, 1976, Ser. No. 697,046
Int. Cl.[2] A01K *97/10, 97/12*
U.S. Cl. 43—16 **8 Claims**



1. A fishing rod holder comprising:

a support member;

a fishing rod retainer pivotably mounted on said support member so that said retainer pivots substantially about a horizontal axis when in normal use;

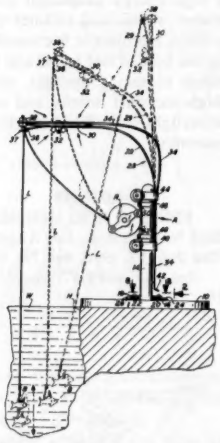
a first spring normally disposed to act between said retainer and said support member to urge said retainer in one direction or rotation with respect to said member;
a means on said support member for cocking said retainer so that said first spring is under energy storage conditon;
said means having a slidable sear for engaging said retainer when in its cocked position;
a second spring disposed to act between said sear and said support member to retract said sear when said retainer is not in a cocked position; and
an electrical terminal electrically insulated and mounted on said means and disposed to have said sear make contact therewith when said retainer is not in a cocked position.
said means further comprises;
an elongated bracket fixed to said member and extending horizontally therefrom;
a pair of bars fixed along side of said bracket in spaced parallel relationship to each other;
a pair of straps each fixed to both of said bars to define an elongated horizontal opening;
said sear slidably disposed with said horizontal opening;
a depending bracket fixed at one end of said retainer to extend towards said sear; and
said depending bracket having an aperture for engaging said sear.

4,077,149

DEVICE FOR JIGGING A FISH BAIT ON A LINE

Andrew N. Enquist, Eldron, Wis., assignor to Walter I. Johnson, Superior, Wis.

Filed Oct. 28, 1976, Ser. No. 736,376
Int. Cl.² A01K *87/00*
U.S. Cl. 43—19.2 **4 Claims**



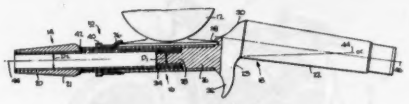
1. A device for jigging a fish bait on a line comprising
(a) a base,
(b) a flexible wand,
(c) means mounting said wand at one end on said base in substantially a vertical position,
(d) a rigid flag member mounted on the other end of said wand,
(e) means for causing said flexible wand to assume an arc position from substantially vertical to a position with said flag horizontal, the action of wind currents upon the flag causing the wand to flex to and fro from any position of the flag, and
(f) means for releasably attaching a fish line with a bait thereon to the outer end of the wand, the line and bait moving up and down in a "jigging" action due to the action of wind currents upon the flag.

4,077,150

FISHING ROD HANDLE ASSEMBLY

Richard D. Barnes, Costa Mesa, Calif., assignor to The Garcia Corporation, Teaneck, N.J.

Filed Feb. 13, 1976, Ser. No. 658,040
Int. Cl.² A01K *87/00*
U.S. Cl. 43—23 **9 Claims**



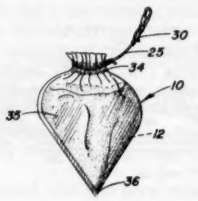
1. A fishing rod handle assembly comprising a forward portion dimensioned to engage one end of a fishing rod blank, an intermediate reel seat portion including retainer means for fastening a fishing reel thereto and a rearward portion including a butt grip, wherein said reel seat and forward portions have a common longitudinal axis, and wherein the longitudinal axis of said butt grip is offset from said common longitudinal axis in a direction such that said butt grip facilitates thumb control of reel spin during casting.

4,077,151

NON-SNAGGING SINKER

Lloyd M. Johnson, 15521 Dalmation Ave., La Mirada, Calif. 90638

Filed Nov. 18, 1976, Ser. No. 742,985
Int. Cl.² A01K *95/00*
U.S. Cl. 43—43.12 **8 Claims**



1. A non-snagging fishing sinker device arranged to receive and store various weighty materials therein, said device comprising:
a flexible plastic bag having at least two side walls wherein one edge formed thereby is open to receive said weighty material therein;
said walls having a plurality of spaced apertures formed adjacent the open edge of said bag; and
wherein said walls include a weakened area in the form of a longitudinal strip formed within each side wall below said apertures and in parallel relation thereto, whereby said bag formed by said walls can be torn and separated from the fishing line to which it would be attached.
a storage compartment defined by said side walls; and
means for securing and closing said opening of said opening of said bag, said means being affixed about said open edge.

4,077,152

PRAIRIE DOLL HOUSE

Donald Newsom, and Clara Newsom, both of Sutter Creek, Calif., assignors to The Raymond Lee Organization, Inc., New York, N.Y.

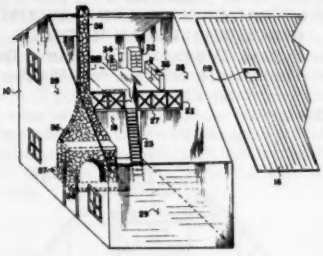
Filed Jul. 26, 1976, Ser. No. 708,312
Int. Cl.² A63H *33/00*
U.S. Cl. 46—12 **1 Claim**

1. A doll house formed with a one-piece detachable roof section, said roof section resting freely on the top of walls of

the house in a plane diagonally inclined to the vertical in the installed position thereof, together with a fireplace unit that is detachably mounted in the interior of the doll house,

said fireplace unit having a base and an integral vertical chimney of rectangular cross-section that extends freely through an opening of rectangular cross-section in the detachable roof section, so as to latch said roof section in place,

said opening of said roof section being bounded on each of four sides by an angle of a length to fit about the external



cross-section of the chimney in the diagonal plane of the installed position of the detachable roof section, together with

a base floor section having means for locating said fireplace unit base and a balcony floor section mounted in the interior of said house, with said balcony section located so that a portion of the base floor section and of the balcony section are exposed to view and are accessible for the placement of furniture on said floor section and balcony section when the detachable roof section is removed.

4,077,153

CHILD'S PLAY BLOCK WITH CARD-RETAINING TANGS

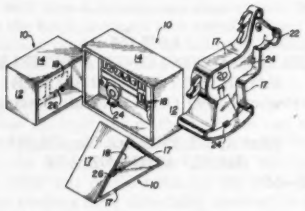
George W. Dunbar, Nashville, Tenn., and Jerrold J. Krumholz, West Orange, N.J., assignors to Klusan, Inc., Nashville, Tenn.

Filed Jul. 19, 1973, Ser. No. 380,610

The portion of the term of this patent subsequent to May 7, 1993, has been disclaimed.

Int. Cl.[2] A63H *33/04*

U.S. Cl. 46—24 2 Claims



1. A play building block of such dimensions as to be readily picked up by a young child's hand comprising a unitary member having the shape of joined, oppositely disposed boxes of similar size and depth and having a common bottom, corresponding sides and open tops, the corresponding sides of said joined boxes forming substantially continuous planar surfaces, the bottom, sides and the top of each box defining the interior of that box therebetween, said block having tangs rigidly mounted on the interior surfaces of opposed sides of at least one of said boxes and just spaced from the bottom thereof to retain a pictorial insert card against said bottom.

4,077,154

TOY BUILDING BLOCK SET

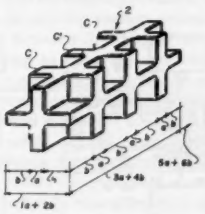
Hermann Müller, Zugerstrasse 43, Cham, Switzerland

Filed Sep. 7, 1976, Ser. No. 720,644

Claims priority, application Austria, Sep. 10, 1975, 6984/75

Int. Cl.[2] A63H *33/06*

U.S. Cl. 46—26 4 Claims



1. A toy building set, comprising a basic form comprising three quadrangular plates arranged in separate longitudinal, transverse and horizontal planes and extending through one another perpendicularly, characterized by elements whose forms are derived from a grating which is formed by lining up this basic form in at least one direction with interposition of a plate extending normal to this direction, and by connecting pieces for the selective connection of some or all elements with one another, which each consist of a quadrangular plate of the same size and thickness as one of the plates of the basic form, and of projections standing out on both sides of this plate which form on each side of the plate a cross-slotted opening which when pegging the connecting piece onto the basic element or an element or when pegging one of these onto the connecting piece serves to receive two plates of the basic form, while the plate of the connecting piece parallel to the third plate of the basic form places itself against the first-named two plates to form the interpositioned plate between the basic form of one element or of the basic element and the basic form adjacent thereto of the element or basic element now connected with it, and thereby not to interrupt said grating of the two connected parts at their junction.

4,077,155

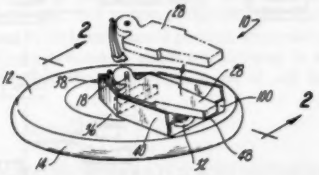
AERODYNAMIC TOY

Joseph A. Bruntmyer, 149 S. Madison, Adrian, Mich. 49221

Filed Jul. 22, 1976, Ser. No. 707,831

Int. Cl.[2] A63H *33/60*

U.S. Cl. 46—74 R 10 Claims

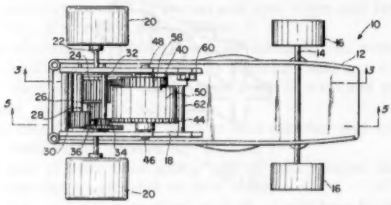


1. A toy comprising a disc shaped aerodynamic throwing implement having an upper substantially circular side and a lower substantially circular side and being of the type adapted to rotate about an axis upon an airborne flight, said axis being substantially perpendicular to and through the center of said disc shaped implement, a member attached to and carried by one side of said implement, and means for detaching and separating said member from said implement at a predetermined number of revolutions of said implement.

4,077,156
TOY VEHICLE WITH ENERGY STORING MECHANISM

Kiyoji Asano, Tokyo, Japan, assignor to Shinsei Kogyo Co., Ltd., Tokyo, Japan

Filed Sep. 17, 1976, Ser. No. 724,075
Int. Cl.[2] A63H 29/02
U.S. Cl. 46—206 8 Claims

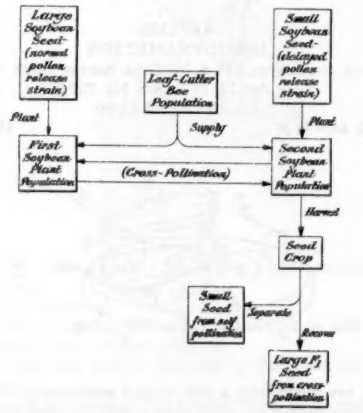


1. A toy vehicle, comprising:
a frame;
first and second axles with wheels for supporting said vehicle secured thereto, and means mounting said first and second axles for rotation with respect to said frame;
energy source means mounted to said frame;
means connected to and activated by the rotation of said first axle in one direction for activating said energy source means to store energy therein, said energy that has been stored being thereafter released by releasing the vehicle causing said first axle to rotate in the opposite direction propelling the vehicle; and
wherein said means for activating also disengages said first axle from said energy source means so as to be free wheeling in said opposite direction when said energy source means has released all of said stored energy.

4,077,157
HYBRIDIZATION OF SOYBEANS VIA THE LEAF-CUTTER BEE

Norman R. Bradner, Marshalltown, Iowa, assignor to Pfizer Inc., New York, N.Y.

Filed May 10, 1976, Ser. No. 684,966
Int. Cl.[2] A01H 1/02
U.S. Cl. 47—58 4 Claims

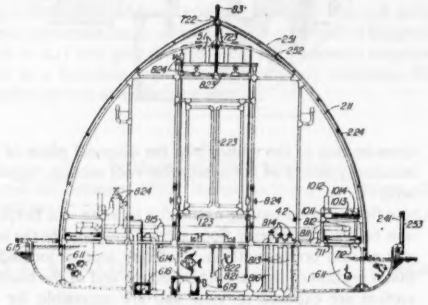


1. A process for the efficient production of seed capable of growing F_1 hybrid soybean plants comprising the steps of:
(a) growing a first population of normal soybean plants in pollinating proximity to a second population of soybean plants characterized by delayed pollen release, each of said populations being of the closed floret type and said first population being characterized by relatively larger seeds than those of said second population upon self-pollination;
(b) exposing the two plant populations to a population of leaf-cutter bees (*Megachile rotundata L.*) sufficiently large to cause extensive cross-pollination;
(c) harvesting the seed crop which is formed on said plants of said second population; and (d) recovering from said harvested seed crop the relatively larger seed resulting from cross-pollination.

4,077,158
AGRICULTURAL GREENHOUSING RECONCILING INTENSIFIED URBAN METHODS

Will Clarke England, 7310 Eastcrest Dr., Austin, Tex. 78752

Filed May 24, 1976, Ser. No. 689,627
Int. Cl.[2] A01G 9/00
U.S. Cl. 47—59 19 Claims

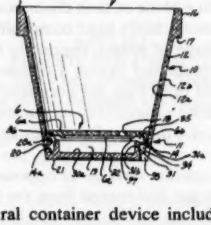


1. A greenhouse comprising a structural skeleton of interconnected frames of reinforced cement grout filled plastic pipe and interconnecting plastic pipe fittings mounted on a floor providing support for and integration with a securely attached translucent plastic skin covering and suspended horizontal riding operator access over said floor and between suspended planters, with electrical and water supply means included and further including a sequenced and timed interval hydronutrient system incorporating elevated storage and mixing tanks supplying by gravity a vertically adjustable, valved hydronutrient distribution network in fluid communication with horizontal planter pipes containing capillary and siphon distributors, said system being adapted to deliver hydronutrients to plants in said planters upon timed activation of a solenoid valve in said vertical network.

4,077,159
HORTICULTURAL CONTAINER ASSEMBLY HAVING FALSE BOTTOM AND SAUCER

Robert J. Haglund, 5990 Orchard Bend, Birmingham, Mich. 48010

Filed Apr. 7, 1976, Ser. No. 674,383
Int. Cl.[2] A01G 9/02, 9/04
U.S. Cl. 47—66 2 Claims



1. A horticultural container device including a longitudi-

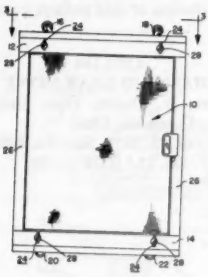
nally extending annular hollow wall having an upper portion and a lower portion, said lower portion having a support edge rim at the lower end thereof, an integral bottom extending from said support edge rim transversely across the interior of said wall to close said lower portion, said integral bottom forming with said upper portion of said wall an open-end pot, said integral bottom having an upstanding annular wall portion positioned a predetermined distance radially inward from said wall whereby a saucer is provided in the bottom of the pot, a separable base mounted in the pot on said wall, said separable base having at least one drain aperture radially inward of said annular wall portion of the saucer and, drain-vent passage means including at least one radial passage extending inward and upward from said support edge rim through said lower portion of said wall outward of and at the base of said upstanding annular wall portion and an interconnecting passage extending between said upstanding annular wall portion and said separable base whereby a drain-vent passage is provided that is in communication at one end with the exterior of said wall past said support edge rim and at its other end with said saucer below said base.

4,077,160

SCREEN DOOR CONSTRUCTION

David E. Stewart, Los Angeles, Calif., assignor to Empire Metal Products Corporation, Los Angeles, Calif.

Filed Dec. 16, 1976, Ser. No. 751,030
Int. Cl.² E05D *13/00*
U.S. Cl. 49—421 **4 Claims**



1. In combination with a screen door, and the like, having a hollow frame defining a channel, and a bonnet fitted over the frame in sliding telescoping relationship therewith, said frame having two aligned holes therein adjacent at least one corner thereof, and said bonnet having two aligned slots therein also aligned with the holes; a corner lock member fitted in friction fit in the channel of the frame to hold the adjacent corner together, said corner lock member including an integral bushing fitted between the aligned holes in the frame; a headed internally-threaded sleeve extending through one of the slots in the bonnet and through one of the holes on one side of the frame into the bushing; and an externally threaded bolt extending through the other one of the slots in the bonnet and through the other one of the holes on the other side of the frame into the bushing to be threadably received in the sleeve, the bolt and sleeve locking the bonnet, corner lock member and frame together when the bolt is tightened into the sleeve.

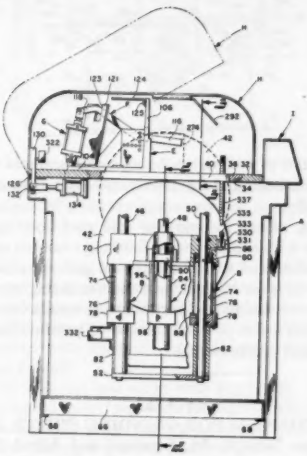
4,077,161

CUT-OFF MACHINE

Frank S. Wyle, Los Angeles, Calif., and Edward F. Keiter, Toledo, Ohio, assignors to Wyle Laboratories, El Segundo, Calif.

Filed Jul. 23, 1976, Ser. No. 708,100
Int. Cl.² B24B *27/06, 55/04;* B26D *1/18*
U.S. Cl. 51—98 R **32 Claims**

1. A cut-off machine or the like comprising; a housing including a top surface having a slot therethrough, a rotatable cutting disc mounted within said housing for movement in raising and lowering directions through said slot, selectively operable elevating means for moving said disc in said raising and lowering directions, selectively operable clamp means movable between first and second positions respectively corresponding to clamping and unclamping positions for selectively clamping workpieces on said top surface, selectively operable cover means movable between first and second positions respectively corresponding to covering and uncovering positions for selectively covering said clamp means and said slot in outwardly-spaced surrounding relationship thereto, selectively operable elevating control means for controlling operation of said elevating means, safety control means movable between closed and open positions for respectively permitting and preventing operation of said elevating means, said safety control means being automatically moved between said closed and



open positions by movement of said clamp means and cover means between said first and second positions so that said selectively operable elevating control means is operative to actuate said elevating means for moving said cutting disc in said raising direction through said slot only when said clamp means and cover means are in said first positions, said elevating means being movable in said raising direction from a lowermost position, and position control means movable between open and closed positions for respectively preventing movement of said clamp means and cover means to said second positions from said first positions thereof and permitting movement of said clamp means and cover means to said second positions from said first positions thereof, and said position control means being in said closed position when said elevating means is in said lowermost position and being in said open position when said elevating means is out of said lowermost position.

4,077,162

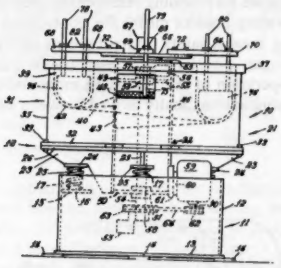
FINISHING APPARATUS AND METHOD

Gunther W. Balz, Kalamazoo, Mich., assignor to Roto-Finish Company, Kalamazoo, Mich.

Division of Ser. No. 414,656, Nov. 12, 1973, Pat. No. 3,981,693.
This application May 14, 1976, Ser. No. 686,516
The portion of the term of this patent subsequent to Sep. 21, 1993, has been disclaimed.
Int. Cl.² B24B *31/06*
U.S. Cl. 51—163.1 **17 Claims**

1. A finishing machine suitable for finishing the surfaces of parts with loose finishing material while maintaining parts isolated from other parts to prevent damage to parts as a result of collision therebetween, said finishing machine comprising:

1) a finishing chamber,
2) means for imparting movement to said finishing chamber to cause the parts contained therein to be finished by interaction with said finishing material,
3) part-isolating means comprising transverse partitions defining at least two compartments arranged to contain a part or parts therein and to maintain said part or parts isolated from other parts in said finishing chamber,



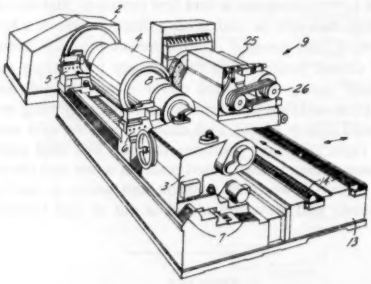
4) wherein one of said part-isolating means and said finishing chamber is arranged for movement with respect to the other, and
5) including means for moving said part-isolating means vertically with respect to said finishing chamber to change the boundaries of said compartment and permit said part or parts to pass beneath said part-isolating means and means for returning said part-isolating means vertically to its previous lower position thereby to redefine the boundaries of said compartment.

4,077,163

PIVOT MECHANISM FOR GRINDING WHEEL INFEED

Robert Gordon Bennett, Jr., Seymour, and Alfred Theodore Parrella, Newtown, both of Conn., assignors to USM Corporation, Boston, Mass.

Filed Jul. 28, 1976, Ser. No. 709,334
Int. Cl.² B24B 49/00
U.S. Cl. 51—165.77 **1 Claim**



1. A machine for grinding a workpiece with a rotatively powered abrasive wheel comprising, a wheel assembly mounted on a carriage for translation therewith along the length of the workpiece; means for providing infeed position adjustment between the abrasive wheel and its rotative empowerment including:

A. A sub base mounted on the carriage for movement towards and away from the workpiece having a support structure mounted thereon for sliding motion in a direction parallel to the infeed motion of the abrasive wheel;

B. a bearing assembly mounted on the sub base and constructed to receive a wheel support element for movement within said bearing and an electric motor fixed to the support structure to generate rotary motion;

C. a wheel support element mounted within the bearing for rotary motion about a fixed axis which is parallel to the axis of the workpiece, having a system of belts and pulleys operatively connecting the motor and a spindle of the abrasive wheel, to transmit rotary motion to the wheel;

D. said spindle constructed to permit rotary motion about a second axis parallel to the axis of the workpiece, said second axis being offset from said first a axis and means coupling the motor support structure to the wheel support element to cause equal movement of the motor support structure in response to infeed movement of the abrasive wheel to maintain the distance between the centers of rotation of the system of belts and pulleys constant; and

E. spindle drive means mounted on the sub base for movement relative to the sub base in response to a rotation of the wheel support element; and said means coupling the motor support structure to the wheel support element to cause equal movement therebetween, said means comprising:

a first link pivotally connected to said spindle drive means;

a second link pivotally mounted on the carriage;

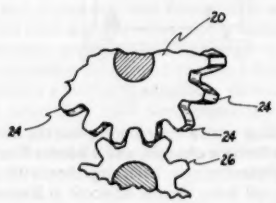
a third link pivotally connected to said slidable motor support structure, said first link being pivotally connected to said second link and said second link being pivotally connected to said third link, movement of said first link causing a corresponding opposite motion of said third link thereby keeping the distance between the centers of rotation of said pulleys constant.

4,077,164

DIAMOND GEAR HONE

Loyal M. Peterman, Jr., Dublin, Ohio, assignor to Abrasive Technology, Inc., Columbus, Ohio

Filed Jun. 23, 1977, Ser. No. 809,316
Int. Cl.² B23F 21/06
U.S. Cl. 51—206 P **5 Claims**



1. In a gear honing tool the combination of a gear-like blank member provided with a plurality of teeth generally adapted to mesh with the teeth of the gear being worked and a monolayer of diamond crystals bonded to the hone teeth to form an abrasive surface, each of said hone teeth carrying said layer of diamond crystals having a predetermined profile configuration having a negative deviation from the true involute form defining a relatively smooth curve having a substantially concave shape.

4,077,165

ABRADING TOOL CLIP WITH AUTOMATIC TAKE-UP

Alma A. Hutchins, 49 N. Lotus Ave., Pasadena, Calif. 91107

Filed Nov. 26, 1976, Ser. No. 745,295
Int. Cl.² B24D 15/00
U.S. Cl. 51—386 **10 Claims**

1. An automatic take-up clip for holding a sheet of abrading material on an abrading tool, comprising:

a first structure having a backing surface adjacent which an end portion of said abrading sheet is to be received;

a clamping element made of sheet form spring material and having a clamping portion adapted to be received oppo-

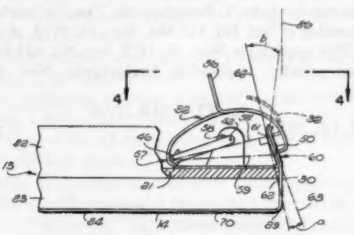
site said backing surface and to clamp the abrading sheet thereagainst;

a link structure for movably mounting said clamping element;

first pivotal connection means attaching said link structure to said first structure for swinging movement relative thereto about a first axis located behind said backing surface;

second pivotal connection means attaching said clamping element to said link structure for relative pivotal movement about a second axis which upon pivotal movement of said link structure about said first axis swings between a released position freeing said abrading sheet from clamped retention by said element and an active clamping position in which said second axis is behind said first axis and slightly overcenter with respect to said first axis and said clamping portion of said element, and in which active position said clamping portion is yieldingly urged tightly against said abrading sheet by the reslience of the clamping element;

said backing surface having a camming portion which, at each of a series of different locations along a predetermined path of take-up movement, is disposed at a slight camming angle of not more than about 20° with respect to



a plane perpendicular to a straight line extending between said active position of said second axis and the part of said camming portion of the backing surface which is nearest to said active position of the second axis, so that as said camming portion advances in a predetermined abrading sheet take-up direction it also advances slightly closer to said active position of the second axis;

said clamping portion of said clamping element being adapted, upon initial actuation of the clamping element to active position, to be received opposite, and clamp said sheet against, a part of said camming portion of the backing surface which is relatively far from said second axis, and to then be cammed with the sheet, by the yielding force of said clamping element, along said camming portion of the surface in said take-up direction and to positions opposite regions of said camming portion which are progressively closer to the second axis, to thereby automatically take up slack in the sheet;

said clamping portion being constructed to grip the sheet in a manner tending to cause the sheet by such gripped engagement to hold said clamping portion of the clamping element against movement in take-up direction except in conjunction with corresponding movement of the sheet to thereby attain said automatic take-up action.

4,077,166

APPARATUS FOR CONTINUOUSLY CONVEYING AND SIMULTANEOUSLY TURNING OBJECTS OF ARBITRARY SHAPE AND SIZE

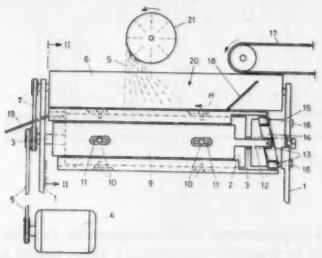
Miroslav Vrana, Zurich, Switzerland, assignor to Hans A. Dietiker, Zollikerberg, Switzerland

Filed Feb. 10, 1977, Ser. No. 767,595

Claims priority, application Switzerland, Mar. 4, 1976, 2727/76

Int. Cl.² B24C *3/14, 3/24*

U.S. Cl. 51—420 **9 Claims**



1. Apparatus for continuously conveying and simultaneously turning objects of arbitrary shape and size, comprising in combination:

a roller;

segments extending longitudinally on the periphery of, and mounted for limited axial displacement on, said roller;

means including said roller with segments for providing a conveyor and turning trough for said objects, wherein said roller with segments forms at least a bottom portion of said trough;

means for rotating said roller with segments;

means coupled to said segments for periodically imparting to said segments a reciprocating axial displacement; and

means for feeding objects to said trough.

4,077,167

SECURITY WINDOW UNIT

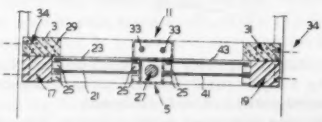
Klaus Rieder, Edmonton, Canada, assignor to Pentagon Industries Ltd., Canada

Filed Nov. 23, 1976, Ser. No. 744,346

Claims priority, application Canada, Jun. 25, 1976, 255688

Int. Cl.² E04H *3/08*

U.S. Cl. 52—106 **25 Claims**



1. A security window unit comprising:

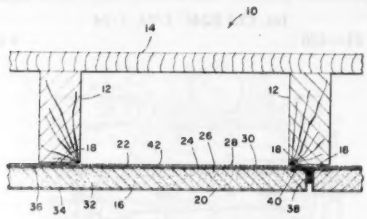
a first frame comprising a first pair of jambs, a first sill and a first head frame, said first pair of jambs, first sill and first head frame each including a rectangular steel channel filled with rigid insulation material, said first frame further comprising at least one first mullion dividing a window opening into sections and including a steel tube housing therein a rotatable bar; and

a second frame comprising a pair of second jambs, a second sill and a second head frame, said second jamb, second sill and second head frame each including a steel channel filled with concrete, said second frame further comprising at least one second mullion dividing a window opening into sections having a width no greater than six inches and including a steel tube filled with hardened concrete.

4,077,168
PREDECORATED GYPSUM WALLBOARD FOR IMPERMEABLE WALL

Richard E. Smith, Williamsville, N.Y., assignor to National Gypsum Company, Buffalo, N.Y.

Filed Jan. 27, 1977, Ser. No. 762,877
Int. Cl.[2] E04C *2/00*
U.S. Cl. 52—622 10 Claims

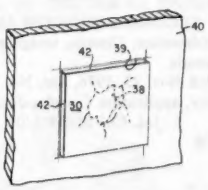


1. A vapor impermeable wallboard suitable for being adhesively applied to framing comprising a basic board having a front face and a back face, said basic board having a laminate of paper and an air impermeable film adhered to said back face, with the air impermeable film side of said laminate adhered directly to said basic board back face, and said paper side of said laminate forming an adhesive-receptive back surface of said vapor impermeable wallboard.

4,077,169
ATTACHMENT FOR HOLLOW WALLS AND METHOD OF REPAIRING SAME

Allan Thaw, Massapequa Park, and John Milcetich, Huntington Station, both of N.Y., assignors to Mechanical Plastics Corporation, Farmingdale, N.Y.

Division of Ser. No. 555,443, Mar. 5, 1975, Pat. No. 3,995,404.
This application Sep. 20, 1976, Ser. No. 724,576
Int. Cl.[2] E04B *1/00*
U.S. Cl. 52—741 13 Claims

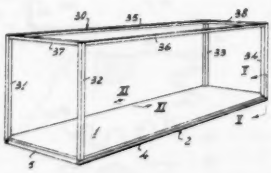


1. A method of repairing a damaged wallboard comprising:
a. taking a repair panel of sufficient area to encompass the damaged portion of said wallboard;
b. positioning said repair panel in face-to-face relation with the damaged wallboard portion such that the periphery of said repair panel encompasses the damaged wallboard portion;
c. tracing an outline of said repair panel onto said wallboard;
d. removing the portion of the wallboard encompassed by said tracing to define an opening in the wallboard;
e. taking at least two attachments for retaining said repair panel within said wallboard opening, said attachments each having:
1. a body member;
2. means on one side of said body member to grip a marginal portion of said wallboard opening; and
3. means on the opposite side of said body member to support said repair panel within said opening;
f. grippingly securing at least one of said attachments to at least two opposed marginal portions of said opening with the repair panel supporting means of each attachment extending inwardly toward the central portion of the opening;
g. positioning said repair panel within said opening and simultaneously applying pressure to said repair panel sufficient to cause rearward surface portions of said panel to engage the repair panel supporting means of each attachment and causing the outward surface portion of said panel to become generally continuous with the outward surface portions of adjacent wallboard portions; and
h. applying a sealing means along the peripheral portions defining said opening and said repair panel.

4,077,170
PREFABRICATED STRUCTURAL ELEMENTS, AND BOX-SHAPED BUILDING SECTIONS FORMED FROM SUCH ELEMENTS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Continuation of Ser. No. 416,644, Nov. 16, 1973, abandoned.
This application Nov. 25, 1975, Ser. No. 635,042
Claims priority, application Netherlands, Nov. 17, 1972, 7215562
Int. Cl.[2] E04B *1/348*
U.S. Cl. 52—79.1 24 Claims

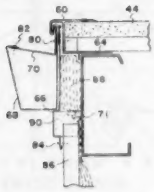


1. A structural element which constitutes a panel for a box-shaped prefabricated section, said structural element comprising a slab of concrete-like cast material, beams composed of a material other than concrete, said slab having an upper side and a lower side, said beams connected at substantially only on one side of said slab so that they are spaced vertically apart from the other side of said slab and the upper surface of said slab is higher than the upper surface of said beams, structural columns which are connected to said beams and extend normally therefrom, said columns each being fastened to an upper side of a portion of at least one of said beams, the lower side of said portion having said slab connected thereto, said beams being provided with an extension on the upper side of each said portion adapted to receive said columns, each said extension having circumferential configuration, the periphery of each said column having a uniform cross-section such that its periphery at its end defines a further configuration matched for being received in a close fit by the outer side of its corresponding said extension, the form of each extension and of the part of the corresponding said column receiving same being such that it determines the exact position of said column relative to said beam on which the corresponding said extension is provided.

4,077,171
PREFABRICATED WATERTIGHT STRUCTURAL SYSTEM

Harold G. Simpson, Oklahoma City, and Clarence S. Salisbury, Moore, both of Okla., assignors to Star Manufacturing Company of Oklahoma, Oklahoma City, Okla.

Continuation-in-part of Ser. No. 336,364, Feb. 27, 1973, and a continuation-in-part of Ser. No. 624,587, Oct. 22, 1975. This application Oct. 28, 1975, Ser. No. 625,882
Int. Cl.[2] E04D *13/00*
U.S. Cl. 52—96 4 Claims



1. The building system which comprises:

a roof supporting substructure including a plurality of spaced, parallel beams;

at least one exterior wall disposed generally along the periphery of the substructure;

an edge structural member disposed on the substructure having a down-turned flange portion generally aligned with at least one of the exterior walls and set out from a structural web portion;

a plurality of rectangular roof deck panels spanning transversely across the parallel beams with the ends of at least a portion of the roof deck panels adjacent the edge structural member, each roof deck panel having a chlorosulfonated polyethylene membrane upper surface and a chlorosulfonated polyethylene tongue and groove fastener half extending along each of the four sides of each roof deck panel;

screw fastener means connecting the opposite edges of the roof deck panels to the spaced parallel beams;

the fastener halves on adjacent panel edges being engaged over the screw fastener means to form a continuous chlorosulfonated polyethylene membrance except at the junctions of the engaged fastener halves at the corners of the panel members;

a plurality of flexible chlorosulfonated polyethylene flashing panels each having chlorosulfonated polyethylene tongue and groove fastener halves along at least one edge, the flashing panels being sealingly connected to the roof deck panels disposed adjacent the edge structural member by engaged fastener halves on the panel member and the flashing panel; and

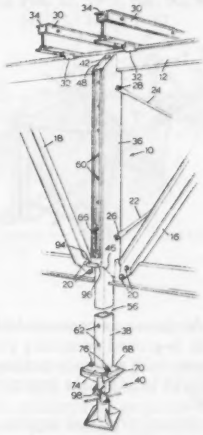
fascia means having a vertical panel section extending upwardly behind the down-turned flange portion of the edge structural member, the flashing panels extending down around the outer face of the down-turned flange portion and upwardly and inwardly over the upper end of and down behind the panel section of the fascia means, the fascia means extending downwardly to direct water to the exterior face of the wall; and

screw fastener means extending through the vertical panel section of the fascia to connect the fascia to the building structure.

4,077,172
EXTENSION LEG FOR TRUSSES FOR CONCRETE FORMING STRUCTURES AND THE LIKE

Ronald J. Johnston, 14 Regan Crescent, Georgetown, Ontario, Canada

Filed Dec. 11, 1975, Ser. No. 639,781
Claims priority, application Canada, Jul. 25, 1975, 232259
Int. Cl.[2] E04H *12/34;* E04B *5/00*
U.S. Cl. 52—111 10 Claims



1. For use in construction of buildings and other structures wherein concrete slabs are poured on a supporting structure temporarily placed for that purpose; and where said supporting structure comprises at least one truss having top and bottom chords, a plurality of beams placed across said truss and a deck placed on said beams; an improved extension leg assembly for said truss, comprising:

a first, outer, leg having a box-like cross-section with a front and a back wall, and adapted to be removably secured to said top and bottom chords of said truss; and

a second, inner, leg having a box-like cross-section with a front and a back wall, telescopically engaged within said first leg; where:

said first and second legs are each formed of extruded aluminum;

said first leg has a cross-section with an interior opening formed axially therein so as to accommodate said second leg;

said top and bottom chords of said truss are secured at the top and bottom ends, respectively, of said first leg, on the back wall thereof, by bolts passed through holes formed in said back wall, and portions of said bolts protrude into the axial interior opening of said first leg;

said second leg has an outer box-like cross-section such as can be accommodated within said axial interior opening of said first leg, with a groove formed in the outer surface of said back wall thereof and having sufficient width and depth so as to accommodate those portions of at least the bolts that secure said first leg to said bottom truss chord and which protrude into said axial interior opening of said first leg;

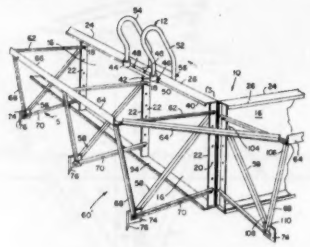
at least two holes having a predetermined axial spacing between them are formed through said front and back walls of said first leg; and

a plurality of holes having the same predetermined axial spacing between pairs thereof are formed through said front and back walls of second leg, so that pairs of pins can be inserted through pairs of holes in said first and second legs to secure them against relative axial movement on to the other.

4,077,173
SWIMMING POOL CONSTRUCTION

Henry A. Rozanski, Box 127, R.D. 2, Elizabethtown, Pa. 17002

Continuation of Ser. No. 483,720, Jun. 27, 1974, abandoned.
This application Sep. 26, 1975, Ser. No. 617,173
The portion of the term of this patent subsequent to Jun. 28, 1991, has been disclaimed.
Int. Cl.[2] E02D *27/00;* E04B *1/38*
U.S. Cl. 52—169.8 12 Claims



1. In a method for forming a concrete deck outwardly of the wall sections of an in-ground swimming pool, said swimming pool having a coping with an upper surface, said coping being supported by the wall sections, the improvement which comprises the steps of:

forming a plurality of structural support assemblies including upper bars and bracing members outwardly of the swimming pool wall sections for aiding in supporting a concrete deck,

attaching portions of at least some of the upper bars and bracing members to the wall sections in vertically spaced locations about the periphery of the pool,

transmitting stresses imposed upon said structural support assemblies directly upon the wall sections in at least two vertically spaced locations,

adjusting the ground level outwardly of the wall sections to form a grade level below said upper bars;

pouring concrete over said structural support assemblies and the grade level to form a peripherally positioned deck; and

supporting substantially the entire weight of the deck by the wall sections whereby settlement of the grade level will not affect support of the deck.

4,077,174
CONSTRUCTION ELEMENT IN PARTICULAR FOR TOWERS, SILOS OR THE LIKE

Jean de Leaumont, Reims, France, assignor to Le Ciment Arme Demay Freres, Reims, France

Filed Sep. 13, 1976, Ser. No. 722,839
Claims priority, application France, May 26, 1976, 76 16092
Int. Cl.[2] E04B *1/60*
U.S. Cl. 52—259 6 Claims

1. A construction element in particular for towers, silos or the like, comprising:

first, second and third panels;

a pair of legs extending from the vertical edges of each said panel;

said legs defining between them a hollow space;

a hole extending through each leg;

each hole being angled from a major face of said panel toward the center of said panel to the hollow space;

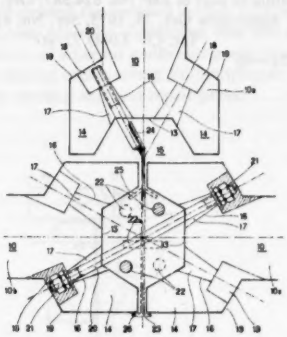
each hole being formed in two portions, a first portion extending from the major face and having a transverse dimension larger than a second portion, said second portion extending from the hollow space and being adapted to receive the end of a rod completely therein;

said second portion being in the form of a truncated cone for aiding in the alignment of a rod passing therethrough;

a pair of rods passing through the holes of said first and second panels and crossing in a generally X-shaped configuration to connect said first and second panels in an end to end relationship whereby the hollow spaces of said first and second panels delimit a chaining recess;

the ends of said rods in said first portions being threaded to receive nuts thereon;

said third panel being connected to said first and second panels by a connecting member;

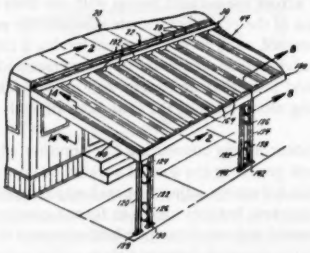


a first section of said connecting member passing through one of the holes in a leg of said third panel and a second section of said connecting member passing between adjacent ends of said first and second panels and into said chaining recess.

4,077,175
PATIO ROOF

Milo F. Hindman, #15 Evergreen, Centralia, Ill. 62801

Division of Ser. No. 571,284, Apr. 24, 1975, Pat. No. 3,984,951.
This application Jul. 2, 1976, Ser. No. 702,193
Int. Cl.[2] E04B *7/00*
U.S. Cl. 52—263 5 Claims



1. An elongated member that underlies a portion of a roof and thereby helps support said roof, said elongated member having an upper portion which is immediately adjacent the under surface of said roof and having a lower portion which is below and co-extensive, at least in part, with said upper portion and also having a generally-vertical intermediate portion, a plurality of upwardly-directed supports which extend upwardly from a supporting surface, said lower portion of said elongated member having openings therein to accommodate the upper ends of said upwardly-directed supports, said upper ends of said upwardly-directed supports extending upwardly through said openings in said lower portion of said elongated member to be co-extensive, at least in part, with said intermediate portion of said elongated member, all portions of said upwardly-directed supports which are coextensive with said generally-vertical intermediate portion of said elongated member being disposed inwardly of the perimeter of said elongated member, the upper ends of said upwardly-directed supports

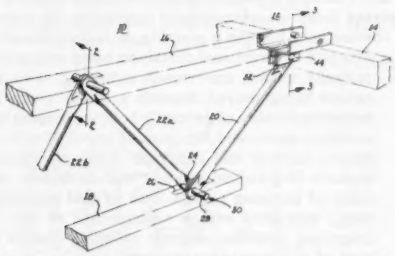
underlying and thereby supporting said upper portion of said elongated member, and fasteners which secure said upper ends of said upwardly-directed supports to said intermediate portion of said elongated member at points above the level of said lower portion of said elongated member, whereby a rigid connection that is independent of the strength of the joint between said intermediate portion and said lower portion of said elongated member is provided between said roof and said upwardly-directed supports.

4,077,176

TRUSS JOISTS

Frederick Bauer, 6913 E. Diamond St., Scottsdale, Ariz. 85257

Filed Oct. 18, 1976, Ser. No. 733,291
Int. Cl.² E04C *3/18*
U.S. Cl. 52—693 **17 Claims**



1. A truss joist supported at one end by a support member which includes an upper surface and an inner surface, said truss joist comprising in combination:

a. an upper chord having a lower surface, first and second side surfaces, and a terminal portion;

b. a lower chord;

c. a series of links connecting said upper and lower chords, said series of links including an end link connected to said lower chords and extending upwardly toward the terminal portion of said upper chord, said end link having an end portion;

d. an end bracket including

i. a channel member having a lower surface positioned below and in contact with the lower surface of said upper chord and first and second side surfaces positioned adjacent the first and second side surfaces of said upper chord;

ii. receiving means disposed below and connected to said channel member and to said end link for connectively receiving the end portion of said end link and for transferring forces from said end link to said channel member;

e. securing means for connecting the end portion of said end link to the receiving means of said end bracket;

f. connecting means for securing said channel member to said upper chord; and

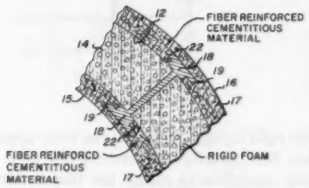
g. coupling means for transferring forces from said end bracket to the upper surface of said support members.

4,077,177

CURVED ARCHITECTURAL STRUCTURE OF FOAM AND CEMENT

Rodney L. Boothroyd, 816 Covington Rd., Belmont, Calif. 94002; Thomas E. Wedge, 2382 Mossdale Way, San Jose, Calif. 95133, and Harry E. Aine, 4008 Twyla La., Campbell, Calif. 95008

Continuation of Ser. No. 496,157, Aug. 9, 1974, abandoned. This application Feb. 12, 1976, Ser. No. 657,499
Int. Cl.² E04B *1/32*
U.S. Cl. 52—741 **8 Claims**



1. In a method of fabricating a curved architectural structure of the steps of:

tensioning a membrane structure into a doubly curved contour of that of at least a portion of a rigid self-supporting doubly curved architectural structure to be fabricated, applying a fluid non-foamed rigidizing material to the doubly curved contour of the curved tensioned membrane, and rigidizing the fluid material to form said rigid self-supporting doubly curved architectural structure having an upper surface and an opposite downwardly facing underside surface;

forming a layer of cementitious material having discontinuous reinforcement fibers dispersed therein overlaying said underside doubly curved surface of said doubly curved self-supporting rigid architectural structure, said layer of cementitious material being contoured to the contour of the adjacent doubly curved surface of the rigid architectural structure and being initially supported therefrom generally free of other reinforcing structure and being initially generally free of mechanical devices therein for coupling said cementitious layer to said architectural structure, and said layer being adhered to said underside surface of substantially only by the adhesion of said cementitious material to said doubly curved underside surface; and

allowing the fiber reinforced cementitious material to harden and become a rigid self-supporting doubly curved fiber reinforced structural member of an architectural structure of fiber reinforced cementitious material.

4,077,178

EASILY PERFORATABLE CONTAINER TO FACILITATE DISPENSING OF CONTENTS

Evan S. Nelson, Iron Mountain, and Charles J. Nelson, Kingsford, both of Mich., assignors to The Nelson Company, Iron Mountain, Mich.

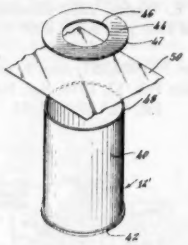
Division of Ser. No. 569,368, April 18, 1975, abandoned. This application Jul. 13, 1976, Ser. No. 704,925
Int. Cl.² B65B *7/28, 61/18*
U.S. Cl. 53—15 **7 Claims**

1. In a method of packaging liquid contents in a can that has a cylindrical can body terminating in can body upper edge with a rigid annular top which is adapted to be secured to said can body upper edge by crimping thereto, the improvement comprising the steps of:

forming an opening in the rigid annular top to be applied to the cylindrical can body,

the size of said opening being in the range of approximately 20 to 65 percent of the diameter of said rigid annular top,

feeding a thin plastic film material between the filled can body upper edge and the rigid annular top to be applied thereto,



sealing the rigid annular top to the can body upper edge with the thin film positioned therebetween in a usual edge crimping operation to clamp the film between the can body upper edge and the rigid annular top, and

trimming the film material to the crimped edge.

4,077,179

AUTOMATIC WRAPPING APPARATUS

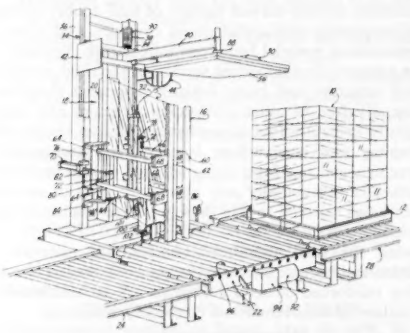
William G. Lancaster, 5101 Upper River Rd., and Patrick R. Lancaster, III, 9410 Tiverton Way, both of Louisville, Ky. 40222

Continuation-in-part of Ser. No. 478,523, Jun. 12, 1974, and a continuation-in-part of Ser. No. 493,050, Jul. 30, 1974, which is a division of Ser. No. 347,873, Apr. 4, 1973, Pat. No. 3,867,806.

This application May 28, 1976, Ser. No. 691,019

Int. Cl.[2] B65B *11/04*

U.S. Cl. 53—32 **12 Claims**



1. A process of making a unitary package from a load comprising a plurality of units comprising the steps of:

a. placing successive loads on a conveying device;

b. transporting one of said loads to a wrapping apparatus;

c. holding a leading edge of a stretchable elastic material in a clamp assembly positioned between the forward and trailing corners of said load in a fixed position adjacent to said load;

d. placing said stretchable material under tension to cause said material to be stretched while rotating said load and said clamp assembly to form an overwrap around said first load and clamp assembly to form a film wrap of at least one layer of stretched film material;

e. releasing the leading edge of stretchable elastic material from said clamp assembly and retracting said clamp assembly from said film wrap away from said load after the first revolution of the load so that the clamp assembly is pulled out of the film wrap and the stretched film assumes the former position of the clamp assembly to cover the area vacated by the clamps assembly;

f. severing said stretched film material from said wrapping apparatus to form a leading edge and a following edge of said wrapped load; and simultaneously

g. clamping the leading edge with clamp assembly in a position to begin wrapping of the following load.

4,077,180

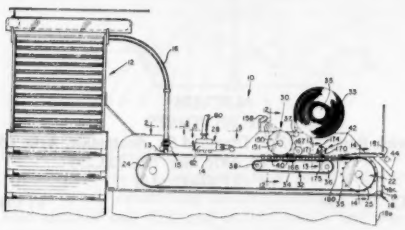
METHOD AND APPARATUS FOR PACKAGING FLUENT MATERIAL

J. Richard Agent, Crete; Donald W. Nielsen, Park Forest, and Thomas A. Cooper, Chicago Ridge, all of Ill., assignors to Portion Packaging, Inc., South Chicago Heights, Ill.

Filed Jun. 17, 1976, Ser. No. 696,932

Int. Cl.[2] B65B *3/12, 3/32, 7/28*

U.S. Cl. 53—37 **27 Claims**



26. A method of packaging predetermined volumes of fluent material in individual containers comprising the steps of:

continuously moving a plurality of said containers along a first path of travel, said containers being arranged in longitudinally spaced, transversely extending rows, said containers being moved beneath a filling pump assembly having a plurality of generally hollow pumping cartridges mounted above said first path of travel of said conveyor means, each of said cartridges being associated with a separate longitudinal series of said containers, and a plurality of pumping pistons, each of said pumping pistons being associated with a separate one of said pumping cartridges to define discrete pumping chambers within each of said pumping cartridges;

moving each of said associated pumping cartridges and pumping pistons relative to said first path of travel of said conveyor means and to one another and thereby filling each of said containers located in more than one of said longitudinally spaced, transversely extending rows with a predetermined, approximately equal volume of fluent material simultaneously; and,

fluid-tightly covering each of said filled containers.

4,077,181

INSERTING APPARATUS

Leslie K. Asher, Norwalk; Charles E. Gibson, Greenwich, and Frank T. Roetter, Westport, all of Conn., assignors to Pitney-Bowes, Inc., Stamford, Conn.

Filed Jun. 21, 1976, Ser. No. 698,168

Int. Cl.[2] B65B *65/08, 5/06, 35/54, 63/02*

U.S. Cl. 53—78 **5 Claims**

1. Apparatus for inserting a plurality of items into an envelope comprising:

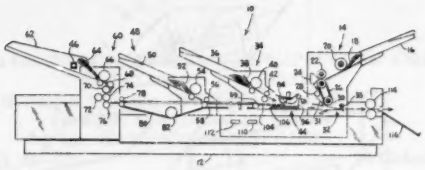
A. means for simultaneously inserting into an envelope a stack of a plurality of first items and a second folded item,

B. means for receiving and stacking said first and second items, said receiving and stacking means comprising a stop finger disposed in a path of travel of said plurality of first items and means for depressing said stack of said plurality of first items and said second item, said depressing means being operable after said items have been received at said stacking and receiving means,

C. means for serially feeding and counting said plurality of first items from a supply thereof to said receiving and stacking means,

D. means for visually displaying the number of said first items counted by said feeding and counting means,

E. means for folding a second item and for feeding said second item from a supply thereof to said receiving and stacking means, and



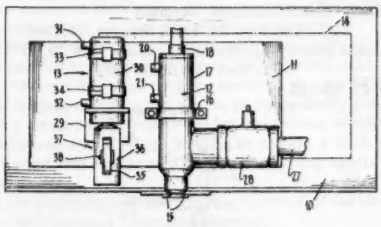
F. means for actuating said folding means, said depressing means, and said inserting means in sequence after said first items have been counted and fed to said receiving and stacking means whereby said second item is folded and fed to said receiving and stacking means and said inserting means thereafter simultaneously inserts said stack of said plurality of first items and said second item into said envelope.

4,077,182

LIQUID FILL APPARATUS

Vincent Papaluca, Melton, Australia, assignor to ACI Operations Pty, Ltd., Melbourne, Australia

Filed Nov. 23, 1976, Ser. No. 744,321
Claims priority, application Australia, Dec. 1, 1975, 4125/75
Int. Cl.² B65B *31/04*; B67B *7/16*
U.S. Cl. 53—109 **7 Claims**



1. Apparatus for liquid filling a flexible, collapsible container, said container having a pouring spout and a closure for said spout, said apparatus comprising:

holding means for holding said spout in a fixed location during the steps of closure removal, evacuation of the container, filling of the container with liquid, inert gas purging of the container, and closure replacement on said spout;

closure removal means for gripping by pinching and removing said closure and for replacing same;

nozzle means for subjecting the interior of said container to a vacuum through said spout, passing liquid into said container through said spout, and passing a purging stream of inert gas into said container through said spout;

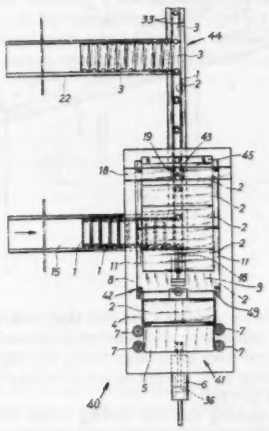
frame member means having said closure removal means and said nozzle means mounted thereon and movable relative to said fixed location from a first position wherein said closure is removed from said container by said closure removal means to a second position wherein the container is evacuated, liquid is passed into said container, and the container is purged with inert gas through said spout, and back to said first position wherein said closure is replaced on said spout.

4,077,183

MACHINE FOR THE AUTOMATIC ASSEMBLY OF VAPORIZERS

Fritz von Philipp, Neuburg, Germany, assignor to Firma Globol-Werk GmbH, Neuburg, Germany

Filed Mar. 24, 1977, Ser. No. 781,061
Int. Cl.² B65B *29/00, 63/04*
U.S. Cl. 53—111 R **10 Claims**



1. A machine with at least one assembly line for serially producing vaporizers with flat wicks folded into U-shape within open-topped, laterally apertured generally prismatic casings capped by complementary covers which are vertically slidable thereon to control the escape of a volatile liquid impregnating the wicks, said assembly line comprising:

a frame forming an upper track and a lower track;

a loading station provided with first feed means for successively depositing dry unfolded wicks on said upper track and advancing said wicks in a row toward a transfer point, said upper track having a discontinuity at said transfer point giving access to said lower track;

an impregnating station between said loading station and said transfer point provided with distributing means connected to a source of volatile liquid, said distributing means adjoining said upper track for letting a quantity of said liquid permeate each wick arriving from said loading station;

second feed means for successively depositing empty casings in an upright position on said lower track and advancing said casing past said discontinuity to a downstream location;

an insertion station at said transfer point provided with plunger means above said upper track synchronized with said first and second feed means and aligned with a transverse centerline of an oncoming wick for forcing the wick through said discontinuity into a casing aligned therewith on said lower track while doubling the wick as it enters the casing; and

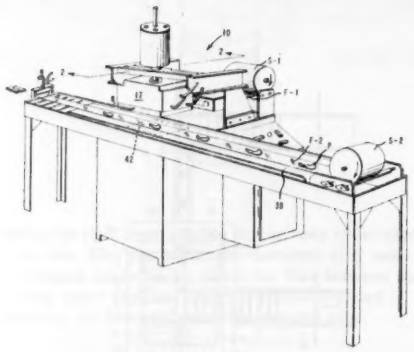
a capping station at said downstream location provided with third feed means synchronized with said first and second feed means for positioning a cover above each oncoming casing, said capping station further including pusher means for thrusting a cover so positioned onto the casing aligned therewith;

4,077,184

PACKAGE-MAKING APPARATUS

Fontaine Theodore Kremer, Jr., and Harold Eugene Ramsey, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 14, 1976, Ser. No. 686,506
Int. Cl.² B65B *31/02*
U.S. Cl. 53—112 A **2 Claims**



1. Apparatus for making a vacuum skin-package including:
a conveyor belt having means defining opposed sets of apertures spaced from each other along the edges of the belt;
a fixed vacuum plate having means defining openings along the edges thereof;
means for moving the belt having a flat lower film and product positioned thereon between such opposed sets of apertures to a package-forming station above the fixed vacuum plate, and the openings in the vacuum plate being connected to a vacuum source;
means for engaging an upper film with a vacuum chamber at the package-forming station;
means for heating the upper and lower films;
means for moving the vacuum chamber and the heated upper film downwardly so as to drape the upper film around the product and to form a hermetic seal between the vacuum chamber, the conveyor belt, the lower and upper films and the vacuum plate and to enclose therewithin opposed sets of apertures in the conveyor belt and opposed openings in the vacuum plate;
means for evacuating the space above the upper film after such hermetic seal is formed;
means for evacuating the space around the product through such opposed sets of apertures in the conveyor belt and opposed openings in the vacuum plate enclosed within such hermetic seal while maintaining the hermetic seal between the vacuum chamber, the upper and lower films, the conveyor belt and the vacuum plate; and,
means for pushing the upper film by pressure differential into skin-tight conformity with the product and into heat-sealing contact with the lower film to form a vacuum skin-package.

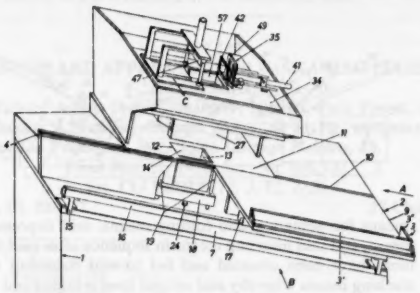
4,077,185

APPARATUS FOR MANUFACTURING AND WRAPPING LABELS

Simon Bleich, 29, Gassergasse, A-1050 Vienna, Austria

Filed Mar. 28, 1977, Ser. No. 782,086
Claims priority, application Austria, Mar. 29, 1976, 2274/76
Int. Cl.² B65B *61/06*
U.S. Cl. 53—123 **6 Claims**

1. Apparatus for manufacturing and building labels, comprising a table, feeding means intermittently operable to move a stack of sheets on said table in two directions which are at right angles to each other to cutting means, which comprise blanking tool means for severing a stack of blanks from the stack of sheets and punching tool means for punching labels from the stack of blanks, said apparatus also comprising means for collecting the punched labels in a stack, and wrapping means for successively wrapping sub-stacks of labels which have been taken from said stack of labels, said punching tool means comprising a punching plate, said blanking tool means comprising a blanking knife spaced outwardly from said punching plate,



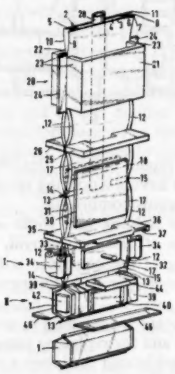
said blanking knife and said punching plate being recessed in a work plate which succeeds the table for guiding the stack of sheets and arranged to act on the stack of sheets from below, said apparatus comprising also a blanking and pressure plate for cooperating with said blanking knife, and a punching knife which is disposed above said blanking and pressure plate and cooperates with said punching plate and serves to guide the labels which have been blanked and punched.

4,077,186

METHOD AND APPARATUS FOR MAKING PACKAGES

Guenther Voegele, Schonaich, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 26, 1976, Ser. No. 745,144
Claims priority, application Germany, Nov. 29, 1975, 2553854
Int. Cl.² B65B *9/12*
U.S. Cl. 53—28 **8 Claims**



1. In a method for making packages for fluid contents, said method including the step of forming a continuous hose from a flexible and sealable material, said hose having two continuous parallel main walls and two side walls folded inwardly in the manner of a V, the further step of subdividing said hose axially with spaced transverse welded seams, thereby forming containers, each seam being applied firstly over only a portion of said hose, leaving an unsealed part, the further step of introducing fluid matter into said containers through said central portion, the step of sealing said unsealed part and severing the

filled container from said hose, the improvement comprising the step of:

introducing fluid matter into said hose such that the level of fluid matter is above said firstly applied seam; and, prior to final sealing,

grasping and moving at least parts of the side walls of said container to thereby enlarge the enclosed volume and cause additional fluid to enter said container through said unsealed part.

4,077,187

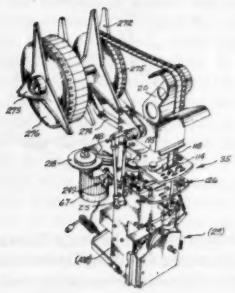
COLD CO-CYCLING BAG CLOSURE IMPRINTING AND BAG CLOSING MACHINE

Jerre H. Paxton, P.O. Box 2098, Yakima, Wash. 98902

Filed Feb. 14, 1977, Ser. No. 768,153

Int. Cl.[2] B65B *61/02*; B41F *17/00*

U.S. Cl. 53—131 **36 Claims**



1. A cold, dry co-cycling bag closure imprinting and bag closing machine adapted to be mounted alongside a conveyor delivering partially loaded slack necked polyethylene bags in a uniformly arranged serial order along a given path leading to and through a work station, said machine comprising:

a cyclically clutch powered means for intermittently advancing flat springy sheet plastic bag closures, each closure having a bag neck trapping aperture, along a different path leading to said work station to successively position such a closure with respect to each loaded bag as said bag is delivered to said work station, to present a slack neck portion of said bag to said bag neck trapping aperture in said closure;

means for gathering into the trapping aperture of the closure the slack bag neck presented thereto;

means for releasing said closure to allow it to depart with said bag from said machine;

an independently cyclically clutch powered cam actuated imprinter for cold-dry printing data on each of said closures during a pause in its travel along said closure path of advance; and

trigger means responsive to said cyclic closure advancing means to activate and time the cyclic action of said imprinter.

4,077,188

APPARATUS FOR APPLYING COVERS TO CONTAINERS

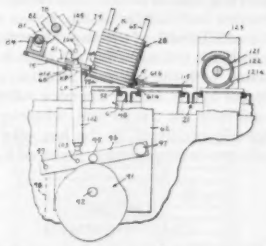
Leo Strombeck, and Ralph F. Anderson, both of Rockford, Ill., assignors to Anderson Bros. Mfg. Co., Rockford, Ill.

Filed Mar. 7, 1977, Ser. No. 774,875

Int. Cl.[2] B65B *7/28*

U.S. Cl. 53—310 **8 Claims**

1. An apparatus for applying covers having a central mouth spanning portion and a peripheral container engaging rim to containers comprising: conveyor means for advancing containers along a container path past a cover applying station with the containers spaced apart along the container path and with the tops of the containers in a preselected container plane, a cover magazine overlying the conveyor means at the cover applying station, said cover magazine having cover support means at its lower end for supporting the bottom cover in the magazine with its underside in an inclined cover plane that converges in the direction of advance of the conveyor means at an acute angle relative to said container plane, said inclined cover plane intersecting said container plane at a cover-container intersect and said cover magazine releasably maintaining the bottom cover in the magazine at a preset position along said inclined cover plane such that the leading edge of the container engaging rim on the bottom cover is disposed adjacent the cover-container intersect, a cover shuttle having a cover engaging nose at its forward end and mounted for reciprocation along an inclined path paralleling said inclined cover plane, shuttle drive means operated in timed relation with said con-



veyor means for reciprocating the cover shuttle between a retracted position in which the nose portion is disposed rearwardly of the bottom cover in the magazine and an extended position in which the nose portion is moved at least part way across the lower end of the magazine a distance sufficient to advance the bottom covers crosswise of the magazines along said inclined cover planes to a position in which the lead edge of the container engaging rim on the bottom cover is disposed substantially forward of the cover-container intersect, said shuttle drive means being so constructed and arranged that the forward velocity and displacement of the lead edge of the container engaging rim on the cover is approximately equal to the forward velocity and displacement of the lead edge of the container along the container path while the lead edges of the cover and container move past the cover-container intersect.

4,077,189

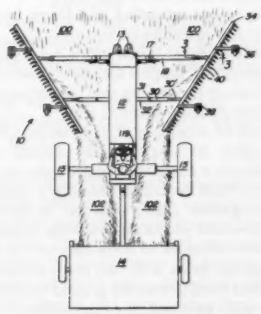
FRONT MOUNTED ADJUSTABLE TWIN RAKES

Walton C. Hering, Rte. 2, Lott, Tex. 76656

Filed Apr. 23, 1976, Ser. No. 679,667

Int. Cl.[2] A01D *77/04, 43/02*

U.S. Cl. 56—11.9 **4 Claims**



1. A farm implement arrangement having an engine driven

tractor with wide spaced driven rear wheels, a towed hay baler mounted behind the tractor for baling hay into rolls, and means for mounting the baler for towed movement with the tractor, the improvement comprising adjustable hay rake means mounted on the front of the tractor for raking hay into windrows, the adjustable hay rake means including two substantially identical longitudinally extending hay rake structures pivotally attached to the tractor, one structure on each side of the tractor, pivotal attachment means for mounting each of the hay rake structures to the tractor for permitting flotation thereof as the hay rake means moves over a field surface of uneven contour, the pivotal attachment means including telescoping tubes, an adjustable retainer pin for locking said tubes once adjusted, a hinge connection to the tractor, a gauge wheel on the outer portion of each of the hay rake structures to permit floating thereof over uneven land contours, telescoping adjusting structure disposed between each of the hay rake structures and the tractor to permit the size of the windrow formed by each hay rake structure to be varied, the telescoping adjusting structure including hydraulic power means for varying the front overall width of the hay rake structures from the operator's seat of the tractor while the tractor is moving, and means associated with the hay rake structures for permitting operation thereof by the tractor operator without leaving the operating position on the tractor seat, whereby two windrows are simultaneously produced by the hay rake structures and two baled rolls are simultaneously produced by the hay baler.

4,077,190

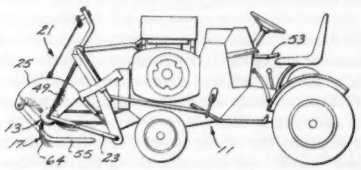
GRASS TRIMMER

Edmond W. Crites, 5618 Oliva St., Lakewood, Calif. 90714

Filed Apr. 26, 1976, Ser. No. 679,884

Int. Cl.[2] A01D *35/24*

U.S. Cl. 56—12.7 **14 Claims**



1. A combination memorial marker trimmer and polisher for trimming grass on opposite sides of headstones of a predetermined width and comprising:

a tractor;

an operator's support on said tractor;

a rotor suspension frame;

support means for supporting said frame on the front of said tractor at a predetermined level above ground;

a horizontally elongated rotor mounted from said frame for rotation about a horizontal axis;

mounting means mounting said frame from said tractor for raising and lowering of said rotor;

a handle coupled with said lifting means and accessible from said operator's support for raising and lowering said rotor;

a prime mover for driving said tractor and coupled with said rotor for rotation thereof; and

a plurality of elongated leather flexible whips mounted on said rotor in longitudinally spaced apart relationship throughout a horizontal length substantially as long as the width of said headstone, having a cross sectional dimension no greater than ¼ inch and no less than ⅛ inch in any direction and projecting radially outwardly therefrom a distance sufficient to form free sweep extremities for engaging said grass with said rotor supported at said predetermined level above the ground whereby rotation of said rotor will cause said free extremities of said whips to whip radially outwardly and said tractor may be driven over said headstones to dispose said rotor centrally thereover, said handle grasped by an operator on said support and manipulated to lower said rotor to flail said grass and sever it from its root and cause sweep extremities disposed medially on said rotor to contact the top surface of said headstone and sweep it clean.

4,077,191

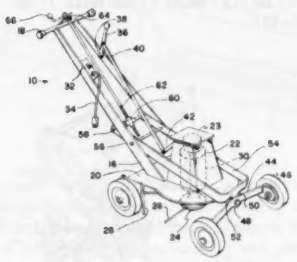
FILAMENT TRIMMER/MOWER

Charles B. Pittinger, Sr., Rte. 1, Box 68, Weatherford, Tex. 76086, and Charles B. Pittinger, Jr., 320 Cockeys Mill Rd., Reisterstown, Md. 21136

Filed Jul. 21, 1976, Ser. No. 707,253

Int. Cl.[2] A01G *3/06*

U.S. Cl. 56—12.7 **10 Claims**



1. In a filament trimmer having a filament drive means carrying a filament, means for fixing filament cutting-length, a frame mounting the filament drive means and filament, a handle extending rearwardly and upwardly from the frame, and means for movably supporting the frame, the improvement comprising: means for supporting the frong and rear ends of the filament trimmer, including a front wheel and axle assembly and a rear wheel and axle assembly, means, connected with the frame and coacting with the handle, for rotating the frame about a longitudinal axis for edging, including: a first connection mounting the front wheel-and-axle assembly pivotally with respect to the frame, and a second connection mounting the rear wheel-and-axle assembly pivotally with respect to the frame.

4,077,192

CONDITIONING CROPS

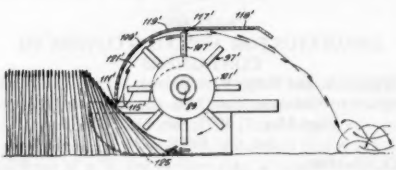
Wilfred Erwin Klinner, Woburn Sands, and Alan Winston Harris, Hitchin, both of England, assignors to National Research Development Corporation, London, England

Division of Ser. No. 363,313, May 22, 1973, Pat. No. 3,977,165, which is a division of Ser. No. 245,819, Apr. 20, 1972, abandoned. This application Jun. 9, 1976, Ser. No. 694,322

Claims priority, application United Kingdom, Dec. 8, 1971, 57064/71

Int. Cl.[2] A01D *43/00*

U.S. Cl. 56—16.4 **15 Claims**



1. An agricultural implement for conditioning crop, comprising:

a frame for movement over a crop to be cut;

a cutter having at least one cutting element;

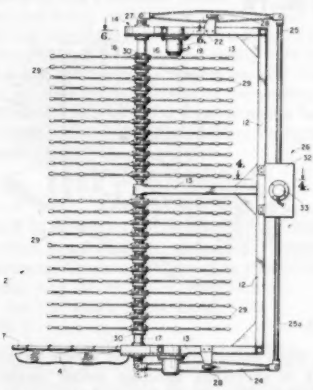
means mounting said cutter on said frame;
means driving said cutting element relative to said frame for cutting the crop over which said frame is moving;
a conditioning rotor for conditioning said crop;
means driving the conditioning rotor in rotation about a substantially horizontal axis in a sense such that, at the lowermost point of the movement of the conditioning rotor, the rotor moves in the same direction as the intended direction of forward travel of the implement;
hood means extending over the conditioning rotor and defining a space through which crop is carried by the rotary motion of the conditioning rotor; and
mounting means mounting the conditioning rotor on said frame in a position such that the rotor extends across at least part of the path of forward travel of the cutter, the said position of the rotor also being such that the rotor engages crop cut by the cutting element before the cut crop falls to the ground,
the conditioning rotor comprising a shaft and an array of discrete conditioning elements mounted for rotation and distributed axially along said shaft, each conditioning element comprising two arms extending in operation outwardly from said shaft relative to the axis of rotation of the conditioning rotor, the two arms being inclined with respect to each other at an inclined angle not greater than approximately 60° and diverging from each other in the outward direction to each present a narrow, abrading edge to the cut crop, each outwardly extending arm having a length at least four times its width taken in a direction along the axis of the rotor, the arms on the rotor having spacing and length relative to their width for enabling the elements to penetrate and move through the crop while it is being conveyed by the rotor, and for conditioning the crop by abrasion between the crop and the conditioning elements passing through the crop.

4,077,193

FRUIT AND NUT HARVESTER

Richard E. Diggs, S. 12A Rd., P.O. Box 776, Carthage, Mo. 64836

Filed Apr. 12, 1976, Ser. No. 675,701
Int. Cl.² A01D *46/24*
U.S. Cl. 56—328 R **14 Claims**



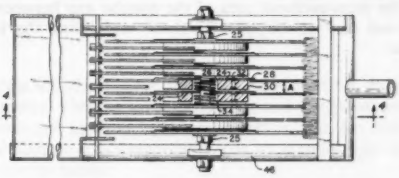
14. Harvesting apparatus for removing fruits, nuts, or the like from a tree or bush, comprising in combination:
a. tine means including a vertically disposed rotary drive shaft having a plurality of horizontally disposed picking tines secured thereto and extending radially outwardly therefrom;
b. vehicle means for transporting said tine means;
c. reciprocating means for effecting upwardly and downwardly directed movement of said drive shaft;
d. drive means for rotating said drive shaft; and
e. automatic velocity varying means automatically rhythmically varying the speed of rotation of said drive shaft in conjunction with said reciprocating means causing said tines to have greater horizontal movement as said drive shaft is reciprocated downwardly and less horizontal movement as said drive shaft is directed upwardly, including said drive shaft having upper and lower ends with said reciprocating means attached thereto and further including helical splines extending through a bushing stabilized against upwardly and downwardly directed movement thereof, said bushing having a coordinating helical keyway therein, said drive means rotating said bushing for driving said drive shaft.

4,077,194

APPARATUS FOR COLLECTING OBJECTS FROM A SURFACE

Almer K. Livingston, Church St., Smithville, Ga. 31787

Filed Apr. 27, 1976, Ser. No. 680,869
Int. Cl.² A01D *51/00*
U.S. Cl. 56—328 R **10 Claims**



1. An apparatus for collecting objects from a surface comprising:
a. a chassis;
b. means for grasping said objects on said surface, said grasping means having a central shaft mounted on said chassis substantially parallel to said surface, a plurality of radially disposed discs on said shaft with the peripheral edge of said discs in contact with said surface, said discs being separated along said shaft a distance less than the smallest cross-sectional dimension of objects to be collected, each of said discs being comprised of a plurality of radially disposed segment, said segments being deformable in a direction parallel to said shaft to grasp the objects between said segments while transporting said objects therebetween when said discs are rotated;
c. means affixed to said chassis between said discs for extracting said objects therefrom during further rotation of said discs; and
d. means on said chassis for collecting the extracted objects.

4,077,195

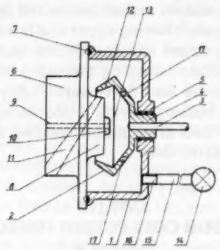
OPEN-END SPINNING AGGREGATE

Fritz Stahlecker, Josef-Neidhart-Str. 18, 7341 Bad Überkingen, and Hans Stahlecker, Haldenstrasse 20, 7334 Süssen, both of Germany

Filed Sep. 10, 1976, Ser. No. 722,033
Claims priority, application Germany, Apr. 9, 1976, 2615505
Int. Cl.² D01H *1/12*
U.S. Cl. 57—58.89 **13 Claims**

1. An open-end spinning aggregate, which includes a housing means adapted to be connected with a vacuum source, a spinning rotor means arranged within said housing means and having an open-end face, insert means projecting into said open-end face and covering the spinning rotor means while leaving an annular gap, said insert means being provided with a central yarn-removal channel and with a fiber feed channel having a discharge orifice disposed opposite a fiber-collecting surface in the spinning rotor means which extends from the open-end face up to a fiber-collecting groove occupying the

area of largest diameter of the spinning rotor means, characterized in that ventilating bore means are provided in the wall surface on the other side of the fiber-collecting groove from the fiber-collecting surface, whose axes extends at least approximately parallel to the axis of rotation of the spinning rotor

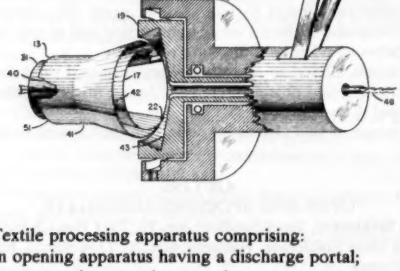


means, characterized in that the total cross section of the ventilating bore means amounts to about one-fourth to about one-half the cross-sectional area of the annular gap between the open-end face of the spinning rotor means and the insert means.

4,077,196
FIBER DISPERSING AND FEEDING APPARATUS FOR OPEN END SPINNING

James I. Kotter, Mandeville, La.; Charles B. Hassenboehler, Knoxville, Tenn., and Craig L. Folk, New Orleans, La., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Nov. 2, 1976, Ser. No. 737,979
Int. Cl.² D01H *1/12*
U.S. Cl. 57—58.95 **1 Claim**

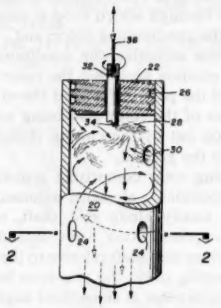


1. Textile processing apparatus comprising:
a. an opening apparatus having a discharge portal;
b. an open-end rotor spinner; and
c. a truncated cone with an opening along the side thereof and with its wide end dispersed inside the opening of, but spaced from, said rotor spinner, and wherein the truncated end of said cone is disposed adjacent said portal so that textile fiber is discharged from said opening apparatus through said portal upon the outer surface of said cone near the truncated end, said fiber directed and dispersed into said open-end spinner;
d. a truncated conically-shaped shroud which substantially completely surrounds, and is spaced from, said cone to define an annular passage therebetween, said shroud having an opening along the side thereof adjacent to the opening along the side of said cone of (c).

4,077,197
OPEN END SPINNING

Woodrow Raleigh Bowden, Melbourne; William H. Hills, Melbourne Village, and Frank Edward Winner, South Merritt Island, all of Fla., assignors to Monsanto Company, St. Louis, Mo.

Filed Jul. 9, 1976, Ser. No. 703,885
Int. Cl.² D01H *1/12*
U.S. Cl. 57—156 **4 Claims**

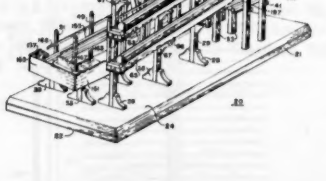


1. A process for forming a yarn, comprising
a. forming an air axially stationary vortex spaced from and rotating about an axis;
b. continuously feeding staple fibers into said vortex;
c. driving a yarn tail in said vortex at a faster revolution rate than said tail would be driven by said vortex alone whereby said fibers affix themselves to and lengthen said yarn tail; and
d. continuously withdrawing said yarn from said vortex.

4,077,198
CLOCK APPARATUS

Harley Mayenschein, 1700 W. Weathersfield Way, Schaumburg, Ill. 60194

Filed Dec. 27, 1976, Ser. No. 754,758
Int. Cl.² G04F *1/00*
U.S. Cl. 58—1 R **16 Claims**



1. A clock apparatus including a base support member, a plurality of spheroids, spheroid holder means movable between first positions thereof aligned to receive moving spheroids thereon and second positions thereof aligned to depart moving spheroids therefrom, time of day indication numerals thereon and said moving spheroids coming to rest thereon in progressive alignment with next higher order indication numerals, first biasing means effective to bias said spheroid holder means into said first position thereof, counter-biasing means to said first biasing means effective to overcome said first biasing means and to bias said spheroid holder means to move to said second position thereof, chute assembly means receiving said

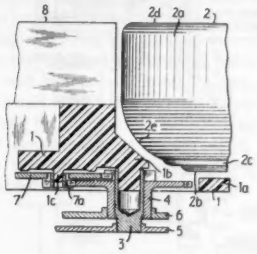
moving departing spheroids from said spheroid holder means and collecting said moving departing spheroids for storage thereof, and time referenced loading means for loading with predetermined time referenced motion thereof said stored spheroids to be moved on to said spheroid holder means whereby the placement order of said spheroids indicates attained time of day.

4,077,199

SMALL SIZED ELECTRONIC TIMEPIECE MOVEMENT

Tadashi Sakuma, and Masatoshi Hanaoka, both of Tokyo, Japan, assignors to Kabushiki Kaisha Daini Seikosha, Japan

Filed Sep. 15, 1976, Ser. No. 723,530
Claims priority, application Japan, Sep. 16, 1975, 50-127043
Int. Cl.[2] G04C *3/00*; G04B *37/04*
U.S. Cl. 58—23 BA **2 Claims**



1. In an electronic timepiece, a timepiece movement comprising a base plate at the front of the movement, a cannon pinion rotatably supported by a portion of said base plate concentrically with the centerline of the timepiece, a minute hand mounted on said cannon pinion, an hour wheel mounted for rotation coaxially with said cannon pinion, an hour hand mounted on said hour wheel, means for driving said cannon pinion and hour wheel, and a battery for powering said timepiece, said battery having a dome-shaped case with a flat base and a receding top portion with a terminal at the top of the dome, means mounting said battery in the timepiece movement with said terminal at the top of said dome toward said base plate, said battery having a diameter greater than the radius of the movement and being mounted so as to extend radially inwardly from one side of the movement to a point beyond the centerline of the timepiece and to extend axially from said base plate to the back of the timepiece movement, said base plate being recessed to receive the battery and the portion of said base plate rotatably supporting said cannon pinion being accommodated in the space provided by said receding top portion of said battery.

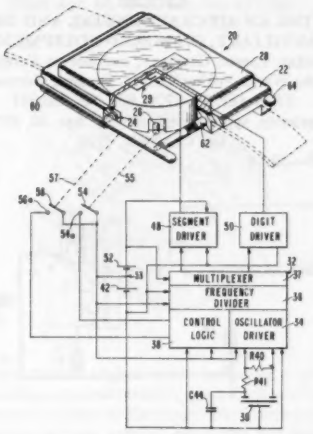
4,077,200

CASE FOR AN ELECTRONIC WRISTWATCH MODULE

Mark R. Schneider, San Jose, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Filed Aug. 23, 1976, Ser. No. 716,611
Int. Cl.[2] G04B *19/34*; G04C *3/00*
U.S. Cl. 58—50 R **5 Claims**

1. An electronic wristwatch assembly comprising:
a case for supporting a module containing a frequency standard, a frequency divider, an electro-optical display means, and switching means for operating said display means;
an elongated member having a straight longitudinal axis retained in an edge of the case;
a second elongated member having a straight longitudinal axis retained in an opposite edge of the case from the elongated member, the axis of the second elongated member being parallel to the axis of the elongated member;
means for biasing the elongated member away from the case including at least one spring disposed perpendicular to the longitudinal axis of the elongated member, and disposed between the elongated member and the second elongated member; and



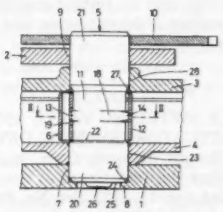
means for coupling the elongated member to the switching means, whereby force exerted on said elongated member causes it to move in a direction other than that direction defined by its longitudinal axis to thereby operate the display means.

4,077,201

EXTRACTABLE BARREL-ARBOR

Friedrich Perrot, Lengnau, Switzerland, assignor to Eta A.G. Ebauches-Fabrik, Switzerland

Filed Oct. 12, 1976, Ser. No. 731,573
Claims priority, application Switzerland, Oct. 21, 1975, 13615/75
Int. Cl.[2] G04B *1/16, 1/18, 31/00*
U.S. Cl. 58—140 R **8 Claims**



1. In a watch movement having a bottom plate; a ratchet wheel; a main spring having one end forming an eye; and a barrel-arbor having a first end pivoting in said bottom plate, a second end attached to said ratchet wheel, a central cylindrical surface supporting an inner end of said eye of said mainspring, and a hook projecting from said central cylindrical surface for attaching said main spring eye to said barrel-arbor; the improvement in said barrel-arbor comprising:
a first cylindrical pivot-bearing surface coaxial with and adjacent to said central cylindrical surface at said first end, the radius of said first cylindrical pivot-bearing surface being greater than that of said central cylindrical surface,
a second cylindrical pivot-bearing surface coaxial with and adjacent to said central cylindrical surface at said second end, the radius of said second cylindrical pivot-bearing surface being equal to or greater than that of said first cylindrical pivot-bearing surface, and
an outer hooking edge of said hook situated at a radial dis-

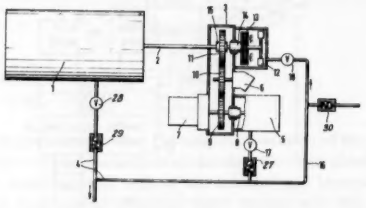
tance from the axis of said barrel-arbor equal to said radius of said first cylindrical pivot-bearing surface.

4,077,202

STARTING AN AIRCRAFT ENGINE AND DRIVING AUXILIARY, ON-BOARD EQUIPMENT

Horst Schutze, Leeste, Germany, assignor to Vereinigte Flugtechnische Werke-Fokker GmbH, Bremen, Germany

Filed Apr. 27, 1976, Ser. No. 680,687
Claims priority, application Germany, Apr. 30, 1975, 2519152
Int. Cl.[2] F02C 7/26
U.S. Cl. 60—39.14 **8 Claims**



1. Apparatus for starting an aircraft engine, having a shaft, and for driving auxiliary equipment such as a pump, a generator, etc., comprising:

an auxiliary machine means for producing rotational power as well as compressed gas;

an air turbine for starting the engine;

pneumatic conduit means for connecting the machine means to the turbine for driving the turbine with compressed gas as produced by the machine means while driving the auxiliary equipment prior to and during starting of the engine;

gear means drivingly connected to said auxiliary equipment;

clutch means for connecting said machine means and said shaft to said gear means so that either can drive said auxiliary equipment but neither of said machine means and said shaft drives the respective other one; and

further clutch means connecting said engine shaft to said turbine so that said air turbine can drive said shaft for obtaining starting of the engine but said shaft cannot drive said turbine.

4,077,203

EMERGENCY METERING VALVE AND GEOMETRY ACTUATOR CONTROL DEVICE

Dennis G. A. Burnell, Winsted, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Apr. 13, 1977, Ser. No. 786,989
Int. Cl.[2] F02C 9/00, 9/08, 9/14
U.S. Cl. 60—39.27 **4 Claims**

1. In a fuel control for a gas turbine engine with variable geometry stator vanes, the combination comprising:

a metering valve for controlling fuel flow to the engine:

a valve driving mechanism operatively connected to the metering valve for positioning the metering valve in accordance with a control signal applied thereto;

a variable geometry actuator for positioning the vanes, the actuator including a cam member for the control thereof;

a cam driving mechanism operatively connected to the cam member for positioning the cam member in accordance with a control signal applied thereto;

an electronic computer, responsive to a plurality of engine parameters, operatively connected to the valve and cam driving mechanisms for applying the respective control signals thereto;

a lever member for setting a requested speed;

a transducer operatively connected to the lever member for directing a requested speed signal to the computer;

a first drive shaft;

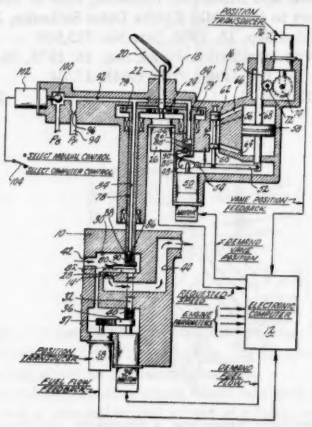
a gear carried by the first drive shaft;

a second drive shaft;

a gear carried by the second drive shaft;

a gear carried by the lever member in meshing engagement with the gears carried by the first and second drive shafts;

a first engagement structure mounted upon the first drive shaft, the first engagement structure being positionable to drivingly engage the metering valve such that rotaion of the first drive shaft positions the metering valve;



a second engagement structure mounted upon the second drive shaft, the second engagement structure being positionable to drivingly engage the cam member such that rotation of the second drive shaft positions the cam member; and

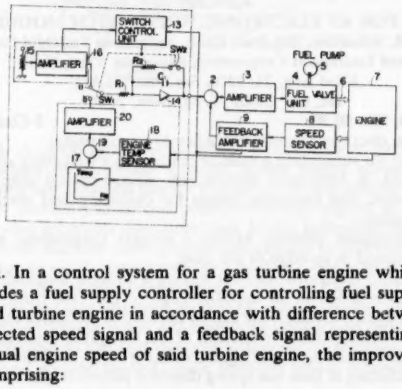
means to drive the first and second engagement structures into respective engagement with the metering valve and the cam member upon application of a manual control signal.

4,077,204

CONTROL SYSTEM FOR A GAS TURBINE ENGINE

Takane Itoh, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan

Continuation of Ser. No. 516,079, Oct. 18, 1974, abandoned.
This application Aug. 5, 1976, Ser. No. 711,883
Claims priority, application Japan, Oct. 23, 1973, 48-119120
Int. Cl.[2] F02C 9/08
U.S. Cl. 60—39.28 R **2 Claims**



1. In a control system for a gas turbine engine which includes a fuel supply controller for controlling fuel supply to said turbine engine in accordance with difference between a selected speed signal and a feedback signal representing the actual engine speed of said turbine engine, the improvement comprising:

a selected speed signal generator for producing said selected speed signal in accordance with the position of an engine speed control means;

an allowance signal generator for producing an allowance signal representing the difference between a predetermined temperature limit and an actual engine temperature; and

switch means connected to said selected speed signal generator and said allowance signal generator, for passing therethrough only said selected speed signal to said fuel supply controller when the difference between said selected speed signal and said feedback signal falls below a predetermined level and only said allowance signal when said difference between said selected speed signal and said feedback signal exceeds said predetermined level, said switch means including a switch circuit for passing therethrough said selected speed signal when it is de-energized and said allowance signal when it is energized, an operational amplifier connected between said switch circuit and said fuel supply controller, a capacitor bypassing said operational amplifier, and a series connection of a resistor and a normally-closed switch, said series connection bypassing said operational amplifier and said normally-closed switch being open when actuated, and a switch control unit for energizing said switch circuit and actuating said normally-closed switch when said difference between said selected speed signal and said feedback signal exceeds said predetermined level.

4,077,205

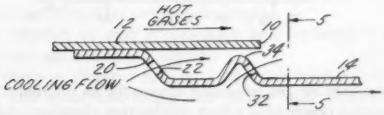
LOUVER CONSTRUCTION FOR LINER OF GAS TURBINE ENGINE COMBUSTOR

Francis C. Pane, South Windsor, and Domingo Sepulveda, Cromwell, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 638,012, Dec. 5, 1975. This application Sep. 7, 1976, Ser. No. 721,145

Int. Cl.[2] F02C *7/18, 7/20*

U.S. Cl. 60—39.32 **3 Claims**



1. For a louver constructed liner for a gas turbine power plant combustor that has a hot wall portion and a cooler wall portion, the hot wall portion subjected to gases of combustion, the opposing cool wall portion subjected to cooling air flow, a lip on the downstream end of the louver overlying and spaced from the adjacent downstream louver on the hot wall portion, cooling air holes in a bent portion of the louver upstream of the lip to flow a film of cool air on the inner wall of the louver opposing the lip, dimple means formed in said cool wall portion for limiting the deflection of the lip, said dimple means spaced laterally in the cool air film and extending from the cool wall portion and terminating short of the opposing wall, and apertures formed on the downstream wall of said dimple means for flowing cool air immediately downstream of said dimple means relative to the flow of cool air so that when said opposing wall portion abuts said dimple means liner burning at this point does not ensue.

4,077,206

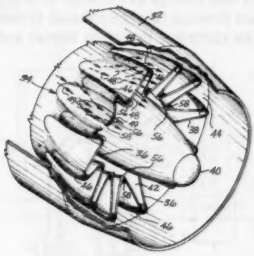
GAS TURBINE MIXER APPARATUS FOR SUPPRESSING ENGINE CORE NOISE AND ENGINE FAN NOISE

Radhakrishna Ayyagari, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Apr. 16, 1976, Ser. No. 677,791

Int. Cl.[2] F02K *11/02*

U.S. Cl. 60—262 **12 Claims**



1. In a gas turbine engine mixer including a plurality of axially extending circumferentially spaced lobes of increasing radial dimension relative to the longitudinal dimension of said mixer, wherein turbine exhaust gases flowing through the interior of said mixer are mixed with secondary gaseous flow passing along the exterior of said mixer to suppress jet noise, improved suppression means for at least partially dissipating the core noise energy contained within said turbine exhaust gases comprising:

first sound absorbing means for absorbing said core noise energy contained within said turbine exhaust gases, said first sound absorbing means axially mounted along the crest of each of said axially extending lobes, each of said axially extending lobes characterized in that the cross-sectional geometry of each lobe defines a convex exponential acoustic impedance matching horn, each of said convex acoustic impedance matching horns for matching the characteristic impedance of said first sound absorbing material to the characteristic impedance of the turbine exhaust flow containing said core noise energy, each of said convex exponential horns having a mouth region opening inwardly toward said flowing turbine exhaust gases and a throat region located radially outward of said mouth region, each of said convex exponential acoustic matching horns maximizing the outward radial transfer of core noise to said first sound absorbing material.

4,077,207

ADDITIONAL AIR CONTROL DEVICE FOR MAINTAINING CONSTANT AIR-FUEL RATIO

Tadashi Hattori, Okazaki; Takamichi Nakase, Gamagori, and Hiroaki Yamaguchi, Nukata, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Nov. 9, 1976, Ser. No. 740,174

Claims priority, application Japan, Nov. 11, 1975, 50-135396

Int. Cl.[2] F02B *75/10*

U.S. Cl. 60—276 **5 Claims**

2. An additional air control device for an internal combustion engine having an intake system, an exhaust system and a catalytic converter for purifying exhaust gases comprising:

a carburetor connected to the intake system of said internal combustion engine and including a passage for substantially rich air-fuel mixture, said passage being provided with a throttle valve for controlling an amount of air-flow;

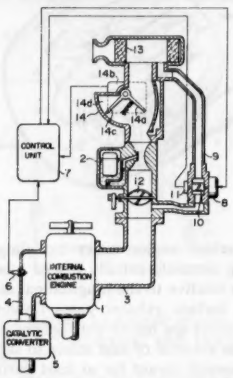
means defining a bypass passage for supplying additional air to the downstream side of said throttle valve;

a control valve mounted in said bypass passage for controlling the amount of additional air flowing therethrough;

drive means coupled to said control valve for driving said control valve to open and close;

gas sensing means mounted in the exhaust system of said engine upstream of said catalytic converter for producing a gas sensing signal corresponding to the composition of exhaust gases flowing through said exhaust system;

delay time factor detecting means for detecting a delay time factor corresponding to a delay time between the occurrence of a change in the air-fuel ratio of mixture supplied into said intake system and the detection by said gas sensing means of said change as a change in the composition of exhaust gases flowing into the exhaust system and thereby producing an electrical detection signal; and



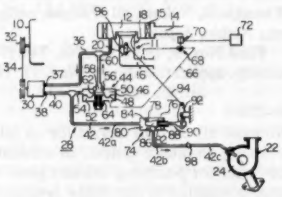
a control unit operatively connected to said gas sensing means, said delay time factor detecting means and said drive means, said control unit receiving said gas sensing signal to thereby determine the direction of operation of said drive means and alternately driving and stopping operation of said drive means and alternately driving and stopping said drive means intermittently, said control unit receiving the detection signal from said delay time factor detecting means to thereby control one of the running time and the stopping time of said drive means and fix the other, whereby the composition of exhaust gases flowing into said catalytic converter is properly adjusted.

4,077,208

SECONDARY AIR SUPPLY CONTROL DEVICE

Hiraki Sawada, Seki, Japan, assignor to Nissan Motor Company, Limited, Japan

Continuation of Ser. No. 502,432, Sep. 3, 1974, abandoned. This application Jul. 22, 1976, Ser. No. 707,690
Claims priority, application Japan, Sep. 4, 1973, 48-99629
Int. Cl.² F02B *75/10*; F01N *3/10*
U.S. Cl. 60—277 **9 Claims**



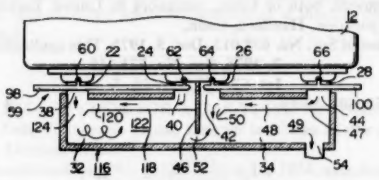
1. A secondary air supply control device for supplying secondary air into exhaust gases discharged from an internal combustion engine, comprising first passage means, an air pump communicating with said first passage means and discharging secondary air under pressure thereinto, a pressure regulating valve operating means having a first chamber which communicates with said first passage means and is formed with a drain port providing communication between said first chamber and the atmosphere, said pressure regulating valve being disposed in said first chamber and being movably located with respect to said drain port, a second chamber communicating with the atmosphere, a flexible diaphragm separating said first and second chambers from each other and operatively connected to said pressure regulating valve, and biasing means urging said diaphragm in a direction opposed by the pressure of secondary air in said first chamber, said pressure regulating valve being operated by said diaphragm to vary the degree of communication between said first chamber and the atmosphere in accordance with the difference between the pressure of secondary air in said first chamber and the atmospheric pressure in said second chamber and regulating the pressure of secondary air in said first passage means to a predetermined value, second passage means communicating with said first passage means, and a flow control valve disposed in said second passage means, and said flow control valve controlling the flow rate of said secondary air passing through said second passage means into the exhaust gases in accordance with the flow rate of intake air drawn into said internal combustion engine.

4,077,209

EXHAUST GAS REBURNING SYSTEM

Suzuo Suzuki, Yokohama; Akio Isobe, and Kenichi Matsuda, both of Yokosuka, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Dec. 22, 1975, Ser. No. 642,775
Claims priority, application Japan, Dec. 23, 1974, 49-147891
Int. Cl.² F01N *3/10*
U.S. Cl. 60—282 **13 Claims**



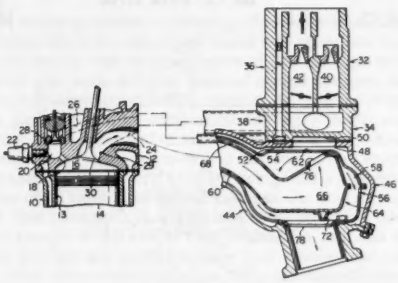
1. An exhaust gas reburning device for an internal combustion engine comprising a first combustion chamber producing first engine exhaust gas containing relatively large quantities of burnable components, a second combustion chamber producing second engine exhaust gas containing relatively small quantities of burnable components, a housing having therein first and second reaction chambers adjoining each other and communicating respectively with said first and second combustion chambers, a main partition member imperforate over a major portion of its area separating said first and second reaction chambers from each other and having a first port opening from said first reaction chamber into said second reaction chamber, a first partition member located in said second reaction chamber and extending from an internal surface of a wall of said second reaction chamber toward said main partition member, and a second partition member located in said first reaction chamber and extending from said main partition member toward a wall of said first reaction chamber, said housing having a discharge port opening from said second reaction chamber externally of said housing.

4,077,210

EXHAUST MANIFOLD

Yoshitaka Ohki, Yokohama; Hiroshi Iida, Tokyo; Kenji Kumagai, Oiso, and Taro Ishi, Yokohama, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Feb. 19, 1976, Ser. No. 659,407
Claims priority, application Japan, Feb. 25, 1975, 50-23060
Int. Cl.[2] F02B *19/10, 75/10;* F01N *3/10*
U.S. Cl. 60—282 2 Claims



1. A manifold system for an internal combustion engine comprising:

an intake manifold having a riser bottom wall; and an exhaust manifold having

an exhaust manifold casing secured to said intake manifold and having an opening positioned in a face-to-face relation with said riser bottom wall;

an intermediate liner mounted within said casing, said intermediate liner having a chamber and a plurality of sleeves extending outwardly from said chamber;

said intermediate liner having a heater wall which forms part of said chamber which extends in spaced and opposite relation to said riser bottom wall so that said riser bottom wall is exposed to heat radiated from said heater wall; and an inner liner mounted within said intermediate liner, said liner having a reaction chamber disposed in said chamber of said intermediate liner and a plurality of tubes extending outwardly from said reaction chamber and through said sleeves, respectively;

said tubes having inlet ports, respectively, adapted for connection to exhaust ports of the engine,

said chamber of said intermediate liner defining a space around said reaction chamber,

said reaction chamber having at least one aperture opening to said space and facing said heater wall to direct the exhaust gases toward said heater wall, said chamber of said intermediate liner having an outlet port for connection to an exhaust pipe,

said aperture of said reaction chamber, said outlet port of said chamber of said intermediate liner and said space between said chamber of said intermediate liner and said reaction chamber of said liner positioned and arranged so that flow of the exhaust gases entering said space from said reaction chamber through said aperture will cover substantially all outer surface area of said reaction chamber before reaching said outlet port,

said tubes having portions, respectively, before opening to said reaction chamber so that the exhaust gases will flow along the inner wall of said reaction chamber to lengthen the flow path of the exhaust gases to said aperture,

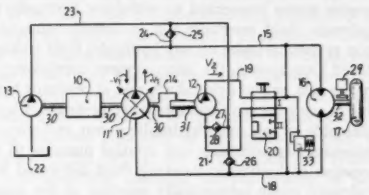
each sleeve of said intermediate liner being formed with a plurality of inwardly projected portions which are circumferentially spaced with each other and abutting the tube extending through said sleeve.

4,077,211

STEPLESSLY VARIABLE HYDRAULIC DRIVE SYSTEM FOR VEHICLE

Hans Jürgen Fricke, Stuttgart, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Nov. 18, 1976, Ser. No. 743,288
Claims priority, application Germany, Dec. 11, 1975, 2555716
Int. Cl.[2] F15B *13/09*
U.S. Cl. 60—428 9 Claims



1. A hydraulic drive system for interconnection of a prime mover and a hydraulically operable load, said system comprising;

a constant-displacement pump connected to said prime mover;

a variable-displacement pump connected to said prime mover and of maximum displacement substantially greater than said constant-displacement pump;

hydraulic conduits connecting said variable-displacement pump with said load, whereby said load can be driven by said variable displacement pump which is in turn driven by said prime mover;

means between said constant-displacement pump and said load including a valve for connecting said constant-displacement pump in parallel with said variable-displacement pump to said load and for disconnecting said constant-displacement pump from said load; and

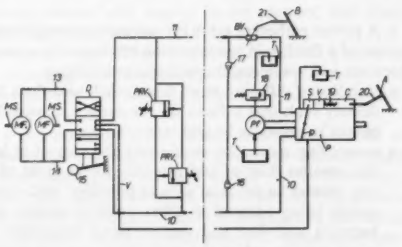
means in said constant-displacement pump for operating same as a motor when said constant-displacement pump is connected with said variable-displacement pump by said valve.

4,077,212

HYDROSTATIC TRANSMISSION CONTROL

Kenneth William Samuel Foster, Prestbury, England, assignor to Renold Limited, Manchester, England

Filed Feb. 11, 1977, Ser. No. 767,891
Claims priority, application United Kingdom, Feb. 21, 1976, 6944/76
Int. Cl.[2] F16H *39/46*
U.S. Cl. 60—431 31 Claims



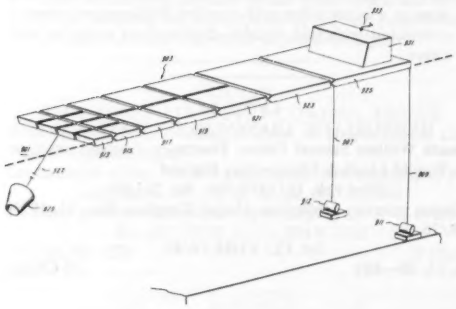
1. In a hydrostatic transmission comprising a main hydraulic pump and a hydraulic motor, one at least of which is a variable displacement device the volume displacement of which is variable by the adjustment of a control member associated

with the device, the hydraulic motor being connected to be driven by hydraulic fluid under high pressure delivered by said pump, the motor having an output drive shaft to provide the output torque from the transmission, said pump and said motor being connected in a closed loop system, there being a hydraulic fluid output line connecting the output side of said pump to said motor to deliver the high pressure working fluid to said motor and a hydraulic fluid return line connecting said motor to the return side of said pump to return to the pump hydraulic fluid under low pressure exhausting from said motor, and a booster pump connected to withdraw hydraulic fluid from a hydraulic fluid reservoir and to deliver same to said closed loop system to make up any hydraulic fluid leakage from said closed loop system, the improvement comprising an accelerator for said output drive shaft, said accelerator being displaceable to vary the maximum delivery pressure of hydraulic fluid attainable by said main hydraulic pump, and control means for automatically adjusting said control member to maintain the pressure of hydraulic working fluid delivered by said main hydraulic pump substantially constant at the maximum value determined by the setting of said accelerator in any particular setting thereof throughout the flow range of said variable displacement device from its minimum flow condition to its maximum flow condition whereby the torque of said output shaft increases with displacement of said accelerator to increase the maximum delivery pressure of hydraulic fluid attainable by said main hydraulic pump and the torque of said output shaft decreases with displacement of said accelerator to decrease the maximum delivery pressure of hydraulic fluid attainable by said main hydraulic pump.

4,077,213
WAVE DRIVEN GENERATOR

Glenn E. Hagen, New Orleans, La., assignor to Williams, Inc., New Orleans, La.

Filed Feb. 13, 1976, Ser. No. 657,892
Int. Cl.² F03G *7/08*
U.S. Cl. 60—500 **30 Claims**



1. A power gathering array for extracting energy from wave motion of a fluid, said wave motion having both an amplitude spectrum and wavelength spectrum, comprising:

a plurality of differing sized floats, each said float having a density such that it floats on the surface of said fluid and moves in response to said wave motion;

a connecting means for connecting the rear of at least one first smaller float of said plurality to the front of at least one second larger float of said plurality, said connecting means being adapted to allow relative motion to occur between said first and second floats responsive to said wave motion when the two floats are oriented so the smallest float points into the direction of wave motion;

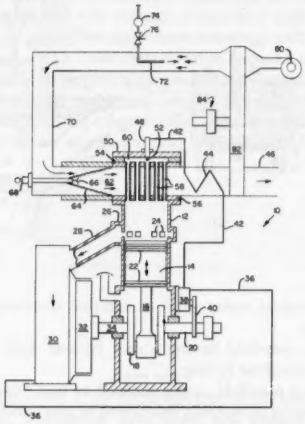
second connecting means for connecting the rear of the largest float of said array to a fixed object; and

work extracting means responsive to said relative motion for extracting a unit amount of work from a unit amount of said relative motion and a non-linearly greater number of units of work from each additional unit of relative motion.

4,077,214
CONDENSING VAPOR HEAT ENGINE WITH CONSTANT VOLUME SUPERHEATING AND EVAPORATING

Jerry Allen Burke, Jr., and John Gordon Davoud, both of 2541 Stratford Rd., Richmond, Va. 23225

Filed Aug. 16, 1976, Ser. No. 714,501
Int. Cl.² F01K *21/02*
U.S. Cl. 60—512 **14 Claims**

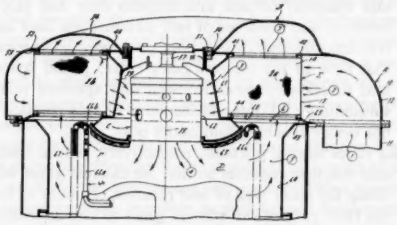


1. A method of operating an external combustion reciprocating piston engine using a condensable vapor as a working fluid and having a cylinder with a piston operating therein characterized in that the heat input communicates with the clearance volume of the cylinder and all of the working fluid mechanically and thermodynamically possible, is removed from the cylinder adjacent and/or following bottom dead center of the piston; wherein the working fluid comprises steam and the water is injected into the clearance volume of the cylinder; and the water is in the region of superheat in respect to temperature at the time of injection.

4,077,215
COMPACT CERAMIC RECUPERATOR PREHEATER FOR STIRLING ENGINE

Lowell A. Reams, Plymouth; Thomas F. Dunlap, Riverview, and Robert K. Fenzan, Livonia, all of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Apr. 5, 1976, Ser. No. 673,848
Int. Cl.² F02G *1/04*
U.S. Cl. 60—517 **1 Claim**



1. In a Stirling engine having an external heating circuit in a closed working fluid system, a heater head assembly for trans-

ferring heat from said circuit to said closed working fluid system, comprising:

(a) an induction means for providing a positive supply of air to said assembly,

(b) an exhaust means,

(c) a combustion unit for adding fuel to said inducted supply of air and combusting said air mixture,

(d) a heating chamber receiving the products of combustion from said combustion unit and within which is disposed a heater tube array for absorbing a predetermined heat content of said combustion products passing thereabout, and

(e) heat exchange means comprising a fixed matrix annularly arranged about the axis of said heater tube array, said fixed matrix having wall defining layers of first passages interleaved with walls defining layers of second passages, said induction means being fluidly connected to one end of said first passages and the combustion unit being fluidly connected to the other end of said first passages, said exhaust means being fluidly connected to one end of said second passages and the heating chamber being fluidly connected to the other end of said second passages, the flow through said first passage is in a generally axial direction taken with respect to the axis of said combustion unit, and the flow through said second passage is in a transverse axial direction therein, the axial flow being substantially equal in volume to the transverse axial flow, said fixed matrix being formed substantially of a heat resisting ceramic material formed of discrete modules, each module having a cubical configuration with one flat face of each of said cubicals forming a closed cylinder about said burner unit whereby a uniform heat flux may be carried forth in said air flow to said combustion unit, said fluid connections between said intake and exhaust, and between the heating chamber and burner unit, are provided by ceramic seals disposed along the edges of said annularly arranged ceramic matrix, said matrix being formed as a plurality of cubicals, each of said cubicals said ceramic seals along the twelve edges thereof, the ceramic seals being comprised of a braided ceramic core encased within a thin distortable metal foil.

4,077,216

STIRLING CYCLE THERMAL DEVICES

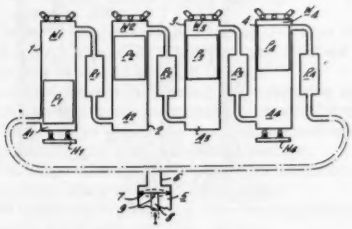
Edmund Harry Cooke-Yarborough, Abingdon, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Aug. 23, 1976, Ser. No. 716,805

Claims priority, application United Kingdom, Aug. 27, 1975, 35373/75

Int. Cl.² F02G *1/04*

U.S. Cl. 60—520 **17 Claims**



1. A Stirling cycle thermal device comprising, a multiplicity of cylinders adapted to contain a working gas; a gas displacement member disposed in each said cylinder and free to oscillate in an axial direction in said each cylinder in response to pressure changes in the working gas therein, said gas displacement member being without a solid mechanism connectable thereto to derive power therefrom and interconnect the oscillatory movements of the gas displacement member with that of the other gas displacement members; a variable volume heat-absorbing chamber defined in each said cylinder between one end of the gas displacement member therein and the respective end of the cylinder; a variable volume heat-rejecting chamber defined in each said cylinder between the other end of the gas displacement member therein and the respective end of the cylinder; and regenerator duct means for flow of the working gas therethrough and disposed so as to interconnect the cylinders in series relationship, each said regenerator duct means being connected at one end to a heat-absorbing chamber of a cylinder and at the other end to a heat-rejecting chamber of an adjacent cylinder to form a system adapted to operate with gas displacement and phase relationship on a Stirling cycle, said device further comprising heating means for heating to a predetermined temperature the heat-absorbing chamber of at least one said system, with at least one further said system having a heat-absorbing chamber unheated by said heating means, so that in operation of the device, the at least one said system having the heat-absorbing chamber thereof heated by said heating means operates as a Stirling cycle heat engine and drives the at least one further said system having the heat-absorbing chamber thereof unheated by said heating means as a Stirling cycle heat pump.

4,077,217

TWO-CIRCUIT MASTER CYLINDER UNIT FOR BRAKES

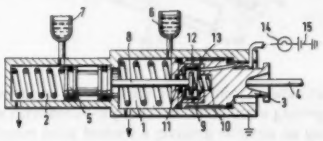
Heinz Leiber, Leimen, Germany, assignor to Teldix GmbH, Heidelberg, Germany

Filed Apr. 28, 1976, Ser. No. 681,204

Claims priority, application Germany, Apr. 30, 1975, 2519228

Int. Cl.² F15B *7/00*

U.S. Cl. 60—535 **10 Claims**



1. In a two-circuit master cylinder unit for brakes, including a first and a second cylinder; a first and a second piston slidably received in the first and the second cylinder, respectively; means defining a cavity in one of the pistons; means for providing hydraulic communication between the two cylinders; means for applying an external force to the first piston for pressurizing hydraulic fluid in the first cylinder to expose the second piston to a pressure dependent upon the pressure generated in the first cylinder; the improvement comprising

a. shackle means for coupling said first and second pistons to one another, said shackle means allowing a relative axial displacement of predetermined magnitude of said first and second pistons with respect to one another; said shackle means having

1. a spacer bar affixed to the other of said pistons and extending into said cavity of said one piston;

2. an enlargement forming a free terminus of said spacer bar in said cavity;

3. a component affixed to said one piston within said cavity for abutting said enlargement to limit the longitudinal displacement of said spacer bar with respect to said one piston in either direction; said longitudinal displacement of said spacer bar constituting said relative axial displacement of predetermined magnitude; and

4. means for urging said enlargement into a normal middle position in which said enlargement is out of contact with said component;

b. an electric switching means constituted by said enlargement and said component; said electric switching means having contacts maintained in an open state in said normal

middle position of said enlargement and maintained in a closed state by the contacting relationship between said enlargement and said component; and

c. warning means operatively connected to said electric switching means and being responsive to the state of said contacts.

4,077,218

ARTICULATED JOINT

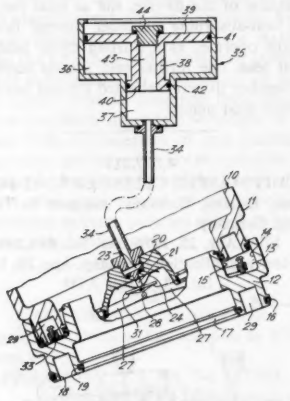
Kenneth Michael Humphrey, Fleet, England, assignor to Underwater and Marine Equipment Limited

Filed Dec. 22, 1975, Ser. No. 643,285

Claims priority, application United Kingdom, Dec. 19, 1974, 55078/74

Int. Cl.² B63C *11/04*

U.S. Cl. 60—592 **15 Claims**



1. An articulated joint, particularly for an underwater diving suit, comprising a first joint member provided with an axial end face having an annular groove; a second joint member having an annular section received in said groove and defining therewith a liquid-filled chamber, said joint members being articulately displaceable with reference to one another and such displacement resulting in gradual loss of liquid from said chamber; a liquid reservoir connected with said chamber; means for maintaining said reservoir at a pressure higher than the pressure in said chamber; and valve means in said second member interposed between said reservoir and said chamber for normally separating the same from one another, said valve means being responsive to a reduction in the volume of liquid in said chamber due to liquid loss therefrom by communicating said reservoir with said chamber for replenishment of the lost liquid.

4,077,219

SUPERCHARGED INTERNAL COMBUSTION ENGINES

Jean Melchior, Neuilly-sur-Seine, and Thierry André, Paris, both of France, assignors to Etat Francais, Paris, France

Filed Apr. 23, 1976, Ser. No. 679,589

Claims priority, application France, Apr. 24, 1975, 75 12744

Int. Cl.² F02B *33/40, 33/44*

U.S. Cl. 60—599 **13 Claims**

1. A power unit comprising:

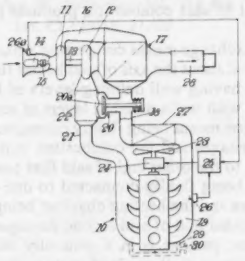
an internal combustion engine having variable volume combustion chambers,

a supercharging turbocompressor unit having a compressor and a turbine, the inlet of said turbine being connected to receive the exhaust gas of said engine,

pipe means connecting the outlet of said compressor to the intake of said engine,

bypass conduit means having an inlet and and outlet always connected and open during operation of said turbocompressor unit to flow the air delivered by said compressor and not drawn by said engine to the inlet of said turbine with a pressure drop which, if appreciable, is substantially independent of the flow rate in the bypass conduit and increases with the output pressure of said compressor,

heat exchanger means located upstream of the junction of the inlet of said bypass conduit means with said pipe means and operable to exchange heat between the pressurized air flow from said compressor to the engine and to said bypass conduit means and the gas flow from the turbine outlet to atmosphere,



and air cooling means located in the air path between said compressor and the intake of said engine downstream of the junction of the inlet of said bypass conduit means with said pipe means so as to be flown only by the air drawn by said engine.

4,077,220

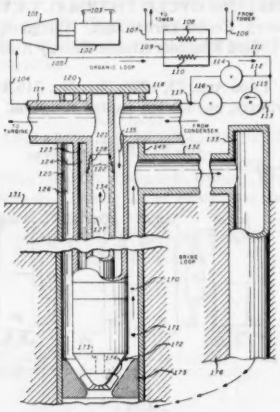
GRAVITY HEAD GEOTHERMAL ENERGY CONVERSION SYSTEM

Hugh B. Matthews, Boylston, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Nov. 9, 1976, Ser. No. 740,282

Int. Cl.² F03G *7/00*

U.S. Cl. 60—641 **12 Claims**



1. Geothermal deep well pumping apparatus located at a subterranean source of geothermal well fluid of the kind including geothermal energy exchange means for providing a working fluid and motor and motor-driven pump rotor means responsive to said working fluid for pumping said geothermal fluid always in liquid state for flow in cooperative energy exchange relation with respect to said geothermal exchange means toward the earth's surface, further including:

conduit means for conveying said working fluid after driv-

ing said motor and motor-driven pump rotor means toward the earth's surface,

lubricant reservoir means supported in heat transfer relation within said conduit means for cooling lubricant fluid contained under pressure within said reservoir means,

cavity-defining body means within said deep well pumping apparatus;

bearing means having bearing stator means affixed within said cavity-defining body means,

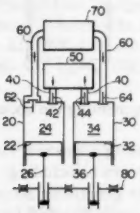
shaft means journalled in said bearing means for supporting in common said motor and motor-driven pump rotor means, and

lubricant pump means within said cavity-defining body means responsive to rotation of said shaft means for continuously circulating said lubricant fluid through the cavity of said cavity-defining body means for lubricating said bearing means and returning said lubricant fluid to said lubricant reservoir means for cooling.

4,077,221
EXTERNAL HEAT ENGINE

Riichi Maeda, Yokohama, Japan, assignor to Nissan Motor Company, Limited, Japan

Filed Jul. 23, 1976, Ser. No. 707,936
Claims priority, application Japan, Jul. 25, 1975, 50-90191
Int. Cl.² F02G *1/04*
U.S. Cl. 60—650 **8 Claims**



1. An external heat engine comprising:

a gas compression apparatus having a movable member arranged to define a variable volumn compression space;

a gas expansion apparatus having a movable member arranged to define a variable volumn expansion space said compression space and said expansion space having the same volumn when respectively maximized;

a driving mechanism arranged to be driven by the movement of said movable member of said expansion apparatus and drive said movable member of said compression apparatus the volumn of said compression space and volumn of said expansion space are simultaneously increased and simultaneously decreased;

a first fluid passage connecting said compression space to said expansion space;

a first heat exchanger arranged to transfer heat from an external heat source to a working gas confined in the engine at a section of said first passage;

a second fluid passage connecting said expansion space to said compression space independently of said first passage;

a first intake valve governing the communication of said compression space with said second passage;

a first discharge valve governing the communication of said compression space with said first passage;

a second intake valve governing the communication of said expansion space with said first passage;

a second discharge valve governing the communication of said expansion space with said second passage;

and a second heat exchanger arranged to absorbe heat from said working gas to a section of said second passage;

said first and said second passages being arranged in conjunction with said first and second intake valves and said first and second discharge valves functioning so that the engine operates according to the following cycle:

(a) compression of working gas confined in said compression space with simultaneous discharge of working gas from said expansion space into said second passage;

(b) discharge of the compressed working gas from said compression space into said first passage with continued decrease in the volume of said compression space;

(c) admission of the compressed and heated working gas from said first passage into said expansion space following the closure of said first passage to said compression space at the end of the decrease in the volumes of said compression and expansion spaces;

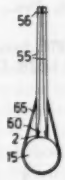
(d) expansion of working gas confined in said expansion space with simultaneous admission of cooled working gas from said second passage into said compression space; and

(e) establishment of communication between said expansion space and said second passage simultaneously with the closure of said second passage to said compression space at the end of the increase in the volumes of said compression and expansion spaces.

4,077,222
SYSTEM FOR DEPOSITING AND PROTECTING SAND ON THE FLOOR OF A SEA, OR OTHER BODY OF WATER

Ole Jeppe Fjord Larsen, 6733 Hjerting, Denmark

Filed Dec. 29, 1975, Ser. No. 644,916
Int. Cl.² E02B *3/04*
U.S. Cl. 61—3 **20 Claims**



1. A system for depositing and protecting sediment on the floor of a body of water comprising a pair of sheets each having opposite longitudinally extending side edge portions and opposite transversely extending end edge portions, first and second longitudinally extending side edge portions of a first of said pair of sheets being in contiguous relationship to respective first and second longitudinally extending side edge portions of a second of said pair of sheets in an inoperative side-by-side upright position of said pair of sheets, said first longitudinally extending side edge portions of said first and second sheets being disposed for pivotal movement between said inoperative position and an operative position at which each sheet is inclined relative to the floor of a body of water and defines therewith an acute angle, and means for releasably securing said first and second sheets together in said inoperative position.

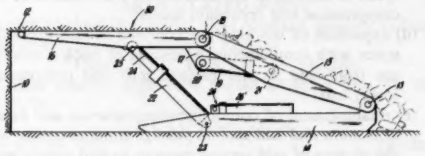
4,077,223
ROOF SUPPORT SHIELD STRUCTURE FOR USE IN AN EXCAVATION

Manfred Koppers, and Ludwig Pawelski, both of Duisburg, Germany, assignors to Rheinstahl AG, Germany

Filed Dec. 12, 1975, Ser. No. 640,328
Claims priority, application Germany, Jan. 11, 1975, 2507319
Int. Cl.² E21D *15/44*
U.S. Cl. 61—45 D **4 Claims**

1. A shield support structure for use in a mine having a floor, a working face with a rear portion and a roof portion including a part with broken down rock, comprising a sill beam adapted to be supported on the floor, a supporting shield disposed against the working face having one end pivoted to said sill

beam and an opposite end, a roof cap comprising a lever having a roof engagement portion pivoted at a first point adjacent its one end to said opposite end of said support shield and having an arm portion extending outwardly from said pivot in a direction toward said sill beam, a first hydraulic piston and cylinder system pivotally connected between said shield at a location intermediate its length and said one arm of said roof cap, a second hydraulic piston and cylinder system pivotally



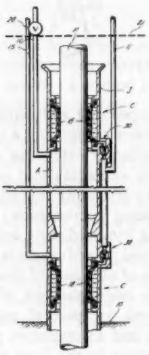
connected to and bearing against said sill beam and to said roof cap for bracing said roof cap against the roof and the broken down rock, said said second piston and cylinder system bearing against said sill comprising a power prop which in a position perpendicular to said working face or inclined toward said working face is pivotally applied against said roof cap at a second point intermediate to the first point and free end of said roof cap.

4,077,224

METHOD AND APPARATUS FOR GROUTING AN OFFSHORE STRUCTURE

Malcolm G. Coone, Houston, Tex., assignor to Lynes, Inc., Houston, Tex.

Filed May 13, 1976, Ser. No. 686,024
Int. Cl.² E02B *17/00*
U.S. Cl. 61—94 **3 Claims**



1. A method of grouting an offshore structure positionable on a sea bed and having at least one supporting leg including a tubular sleeve in the water and a piling insertable in the sleeve, said piling having an outside diameter smaller than the inside diameter of the sleeve to thereby form an annular space between the sleeve and piling, said method comprising the steps of:

(a) Positioning normally contracted and selectively expandable seal means on the sleeve for isolating at least a portion of said annular space;
(b) Expanding the seal means to sealingly engage the piling
(c) Discharging water from the annular space;
(d) Introducing a settable grouting material into the annular space under pressure; and
(e) Releasing said pressure upon setting of said grouting material,

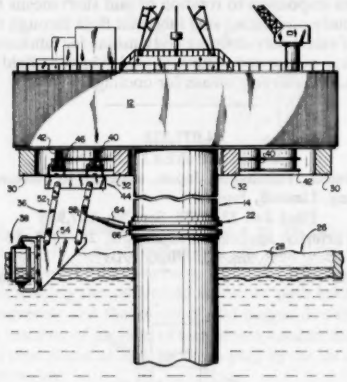
the settable grouting material being introduced into the annular space and maintained under pressure until set, said pressure being greater than the static head pressure exerted by the grout column and water column at the grouting depth.

4,077,225

APPARATUS FOR ICE DISAGGREGATION

Gunter J. Lichtenberger, and George W. Morgan, both of Dallas, Tex., assignors to Sun Oil Company Limited, Toronto, Canada

Filed Feb. 28, 1977, Ser. No. 772,792
Int. Cl.² E02B *15/02*; B63B *35/12*
U.S. Cl. 61—103 **8 Claims**



1. A system for fragmenting ice about an offshore structure comprising:

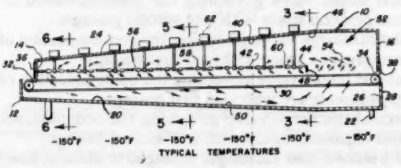
A. means for directing acoustical energy into the ice, said energy directing means including:
i. a transducer for generating acoustical energy;
ii. an elongated beam adapted for engagement with the ice;
iii. means for coupling said transducer to said beam such that acoustical energy generated by said transducer is transferred to said beam and is applied to the ice from said beam;
B. first support means for rotatably supporting said energy directing means such that said energy directing means may rotate about a first axis; and
C. means for rotating said energy directing means about the first axis.

4,077,226

CRYOGENIC FREEZER

William K. Strong, Solvang, Calif., assignor to Restaurant Technology, Inc., Oak Brook, Ill.

Filed Jul. 6, 1976, Ser. No. 702,442
Int. Cl.² F25D *13/06*
U.S. Cl. 62—63 **22 Claims**



1. An isothermal freezer, comprising:

an elongated cryogenic flash freezing tunnel having longitudinally spaced ends, one of which defines an inlet and the other which defines an outlet for the ingress and egress of conveyorized comestible material;

conveyor means for conveying comestible material from said inlet to said outlet and through said tunnel;

elongated duct means overlying and spaced from said conveyor means and extending along an upper portion of said tunnel, said duct means including portions defining a plurality of longitudinally spaced outlet apertures generally facing said conveyor means and defining a fluid-flow inlet passageway spaced away from and disposed intermediate said ends;

nozzle means longitudinally spaced from said elongated duct means in said tunnel adjacent and between said fluid-flow inlet passageway and one of said ends for discharging cryogenic liquid into a conditioning zone in said tunnel in which zone heated cryogenic gas is conditioned and chilled by vaporized cryogenic liquid;

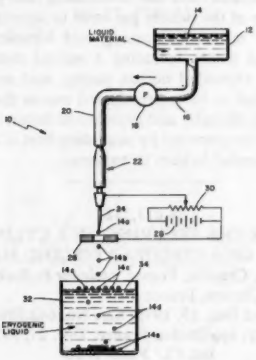
fan means positioned in generally vertical alignment with said outlet apertures for conveying said conditioned and chilled cryogenic gas through said duct means and through said outlet apertures and downwardly against said conveyorized comestible material, so that said conveyorized comestible material is blanketed with said conditioned chilled cryogenic gas which is at a substantially uniform temperature along the length of said duct means.

4,077,227

METHOD OF FREEZING LIQUID MATERIAL IN WHICH AGGLOMERATION IS INHIBITED

E. Virgil Larson, St. Paul, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Nov. 12, 1976, Ser. No. 741,304
Int. Cl.² F25C *1/00*
U.S. Cl. 62—74 **14 Claims**



1. A method of freezing a quantity of liquid material comprising the steps of separating said quantity of material into individual drops, applying an electric charge of one polarity to said drops, and freezing said drops while still charged.

4,077,228

REFRIGERATED DISPLAY CASE

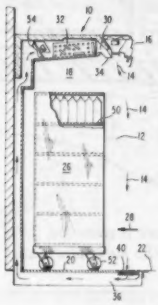
Neal P. Schumacher, Trenton, N.J., and Shyamol K. Ghosh, Barrie, Canada, assignors to Emhart Industries, Inc., Farmington, Conn.

Filed Aug. 16, 1976, Ser. No. 714,722
Int. Cl.² A47F *3/04*; F25D *15/00*; F24F *13/00, 9/00*
U.S. Cl. 62—256 **5 Claims**

1. In a refrigerated food product display case of the type that comprises a stationary display fixture having a vertical back wall, an open front through which a customer is permitted unimpeded access to the interior of the case and across which an air curtain extends to isolate the displayed products from a surrounding store area, a rear duct extending downwardly along said back wall, and an upper duct in communication with the rear duct and projecting forwardly from the back wall, said upper duct having a discharge opening at its forward end through which air is discharged at the front of the case to form the air curtain, said case further comprising a product display cart rollable into and out of said fixture, the improvement that comprises:

a. a recessed floor surface formed in and opening upwardly into the store area directly below the fixture and generally coextensive with the fixture from front to back thereof; and

b. a base for said fixture in the form of a horizontal plate therein that defines the bottom of the fixture and cooperates with the back wall, upper duct, and the front of the fixture to define the interior of the case, said plate providing a surface upon which the cart is directly supported, the plate covering said recessed floor surface to define therebetween a lower duct bounding and disposed wholly outside the case interior below the surrounding floor area of the store, the plate being level with the floor area of the store surrounding said recessed floor surface, said plate intersecting with the lower extremity of the back wall and said lower and rear ducts extending into communication with each other at the intersection of the base plate and the back wall, one at least of the back wall and the front of the case having a cart passage extending fully to the floor level surrounding the recessed floor surface to define an opening through which the cart may be rolled into and out of the case.



4,077,229

HOUSEHOLD REFRIGERATOR WITH AIR CIRCULATION AND COOLING ARRANGEMENT

Robert B. Gelbard, and James R. Griffin, both of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Jan. 3, 1977, Ser. No. 756,235
Int. Cl.² F25B *5/00*; F25D *11/02*
U.S. Cl. 62—283 **13 Claims**

1. In a refrigerator including a first food storage compartment to be maintained at a temperature above freezing and a second food storage compartment to be maintained at a temperature below freezing, an air circulating and cooling arrangement comprising:

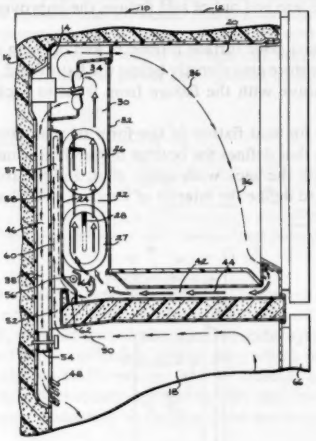
(a) an evaporator including a plate and a cooling element mounted on one side of said plate in heat exchange relationship therewith;

(b) said cooling element being positioned in a first passage outside both of said compartments;

(c) means defining a second passage on the opposite side of said plate from said cooling element;

(d) means for circulating air over said evaporator and through said compartments; and

(e) means for directing air from said first compartment to said second passage and thereafter to said first passage,



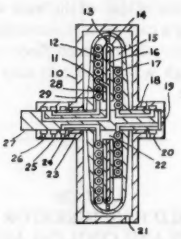
whereby moisture is removed from the air in said second passage before the air contacts said cooling element.

4,077,230

ROTARY HEAT EXCHANGER WITH COOLING

Michael Eskeli, 7994-41 Lacke Lee, Houston, Tex.

Continuation-in-part of Ser. No. 361,281, May 17, 1973, abandoned. This application May 30, 1974, Ser. No. 474,729
The portion of the term of this patent subsequent to Jan. 20, 1993, has been disclaimed.
Int. Cl.[2] F25B *3/00*
U.S. Cl. 62—401 **3 Claims**



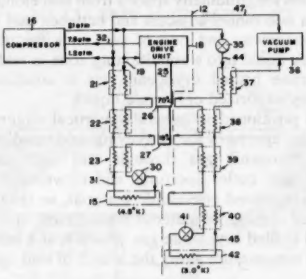
1. In a rotary heat exchanger, comprising a rotatably mounted rotor, said rotor having first and second passages extending continuously outwardly from the axis of rotation of said rotor, passage means for connecting the outer ends of said first and said second passages, passage means for connecting the inner ends of said first and said second passages, to allow a fluid to flow outwardly and be compressed in said first passage and to flow inwardly and expand toward the center of rotation in said second passage, a compressible fluid within said passages, a first heat exchanger carried by said rotor for removing heat from said fluid and being at least in part adjacent to the outer end of said first passage and being at least in part adjacent to the outer end of said second passage, a second heat exchanger carried by said rotor and located in the second passage for adding heat into said fluid, the improvement comprising a third heat exchanger carried by said rotor adjacent to the inner ends of said first passage, for removing heat from said fluid as it enters the first passage.

4,077,231

MULTISTATION REFRIGERATION SYSTEM

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of and Ervin R. Wiebe, Sunland, Calif.

Filed Aug. 9, 1976, Ser. No. 712,981
Int. Cl.[2] F25B *19/00*
U.S. Cl. 62—514 R **17 Claims**



1. In a refrigeration system of the type including a source of helium gas and including a first cooling station for cooling parts thermally attachable thereto to a first temperature less than the critical temperature of helium, an arrangement comprising:

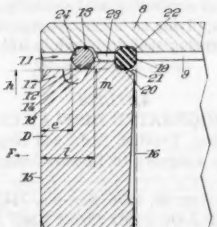
means for providing a preselected capacity of net cooling at a second temperature, lower than said first temperature, said means including first means for receiving helium gas from said source and for controlling the pressure and temperature of the helium gas so as to liquefy the helium, and second means for causing said liquefied helium to expand, said means including a second station through which said expanded helium passes, said second station being adapted to have preselected means thermally coupled thereto whereby said preselected means are cooled to said second temperature by providing heat of vaporization for the expanded helium to vaporize.

4,077,232

MEANS FOR THE SECURING, IN A CYLINDRICAL MEMBER, OF A CIRCULAR DISCOID MEMBER

Albert Grosseau, Chaville, France, assignor to Societe Anonyme Automobiles Citroen, France

Filed Dec. 19, 1975, Ser. No. 642,596
Claims priority, application France, Dec. 27, 1974, 74 43081
Int. Cl.[2] F16D *1/06*
U.S. Cl. 64—11 R **7 Claims**



1. An assembly comprising: a cylindrical member having an internal surface formed with an annular groove; a circular discoid member received in said cylindrical member, said circular member having two end faces and a peripheral surface formed with an abutment zone; and a resilient split ring received in the groove of said cylindrical member and projecting

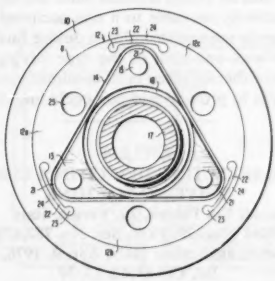
inwardly of the internal surface of said cylindrical member for engagement with the abutment zone of the peripheral surface of said circular member to retain said circular member against an axial force applied thereto in one direction while permitting axial displacement of said circular member in the other direction by a sufficient opposing axial force acting in said other direction, said resilient ring being disposed completely between the end faces of said circular member when said resilient ring is in engagement with the abutment zone of the peripheral surface of said circular member; in which assembly the improvement comprises: said circular member having a peripheral surface portion which has a diameter less than the internal diameter of said resilient ring when said ring is received in the annular groove of said cylindrical member and at least equal to the internal diameter of said resilient ring when said ring is in a compressed condition for introduction into said cylindrical member, said peripheral surface portion being disposed between the abutment zone and one end face of said circular member which is on the axial side of said resilient ring remote from the abutment zone; and said circular member being axially displaceable relative to said cylindrical member in said other direction by an amount enabling said resilient ring to be retracted radially inwardly of said cylindrical member out of the annular groove of said cylindrical member.

4,077,233

INSTALLATION FOR VIBRATION DAMPING IN DRIVE CONNECTIONS OF MOTOR VEHICLES

Rudolf Hörnig, Esslingen; Bruno Beeskow, Bietigheim, and Günter Wörner, Rommelshausen, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Feb. 20, 1976, Ser. No. 659,707
Claims priority, application Germany, Feb. 26, 1975, 2508212
Int. Cl. F16f *15/12*
U.S. Cl. 64—11 R **23 Claims**



21. An installation for damping vibrations in drive connections of vehicles comprising vibration damping means for damping both torsional vibrations of a vehicle drive connection and bending vibrations of a driving means of the drive connection, said vibration damping means including an annular mass member and an elastic body means for operatively connecting said mass member with the driving means, wherein said elastic body means includes an elastic member having a cylindrical surface arranged at said mass member and a substantially polygonal surface arranged at the driving means, and wherein axially parallel bores are provided in said elastic member diametrically opposite to apices of said polygonal surface.

4,077,234

COUPLING APPARATUS

Gerald J. Crochet, Sr., 508 Beverly Dr., Lafayette, La. 70501

Filed Feb. 27, 1976, Ser. No. 662,036
Int. Cl.² B62D *53/00*
U.S. Cl. 64—17 R **24 Claims**

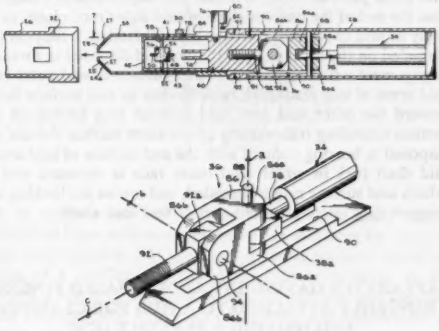
1. Coupling apparatus for coupling first and second objects together and including:

first coupling means carried by said first object and comprising:

a housing rigidly affixed to said first object;

a latching assembly carried by said housing and including first latch means;

a universal joint assembly carried by said housing and connected to said latching assembly for providing pivotal movement of said latching assembly with respect to said first object about first, second and third generally mutually perpendicular axes; and



drive means carried by said housing and connected to said universal joint assembly for longitudinally extending and retracting said universal joint assembly with respect to said housing between a first joint position in which said universal joint assembly is locked against said pivotal movement by said universal joint control assembly and a second joint position in which said universal joint assembly is freed for said pivotal movement; and

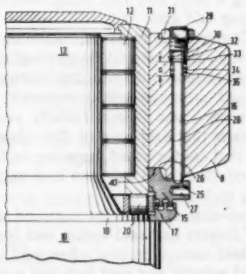
second coupling means carried by said second object and comprising second latch means, said first latch means being automatically engageable with said second latch means to effect coupling of said first and second objects.

4,077,235

BEARING ARRANGEMENT FOR UNIVERSAL JOINTS

Hans-Joachim Kleinschmidt, and Günter Napierala, both of Essen, Germany, assignors to Gelenkwellenbau GmbH, Essen, Germany

Filed Feb. 24, 1977, Ser. No. 771,760
Claims priority, application Germany, Feb. 25, 1976, 2607515; Nov. 27, 1976, 2653908
Int. Cl.² F16D *3/16*
U.S. Cl. 64—17 A **4 Claims**



1. Bearing arrangement for universal joints including a shaft fork having a pair of laterally spaced arms each having a first bore therein, a roller bearing fitted into the first bore in each of said arms, a cross joint member extending between said arms

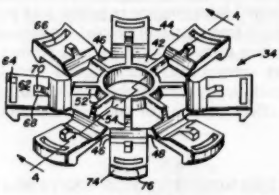
and comprising a body located between said arms and an axially extending pin projecting from each of the opposite ends of said body with said pins each supported in one of said roller bearings, each said roller bearing comprising an outer race having an inner surface and an outer surface with the outer surface facing against the surface of the first bore in said arm of said shaft fork, said outer race having an end surface facing toward the body of said cross joint member, a collar disposed between and in contact with the end surface of said outer race and said body of said cross joint member, roll bodies arranged in said collar and rolling at least indirectly on said cross joint member, said outer race arranged to absorb axial forces from said cross joint member, wherein the improvement comprises that the end of the outer surface of said outer race closer to the body of said cross joint member being threaded, a support ring threaded on the inner surface thereof and disposed in threaded engagement with the threaded outer surface of said outer race, said arms of said shaft fork each having an end surface facing toward the other said arm, said support ring having an end surface extending transversely of the inner surface thereof and disposed in bearing contact with the end surface of said arm of said shaft fork in which said outer race is mounted and on which said surface ring is threaded, and means for locking said support ring relative to said arm of said fork shaft.

4,077,236

APPARATUS HAVING INWARDLY BIASED FINGERS HINGEDLY ATTACHED TO A HUB FOR CLAMPING AND DRIVING A FLEXIBLE DISC

Warren L. Dalziel, Monte Sereno, Calif., assignor to Shugart Associates, Sunnyvale, Calif.

Filed Mar. 11, 1976, Ser. No. 665,885
Int. Cl.² G11B *25/04*
U.S. Cl. 64—22 **12 Claims**



12. An apparatus for clamping and driving a flexible disc for use with a spindle having a generally conical portion forming a camming surface and having a generally cylindrical portion forming a first disc clamping surface and a disc registration surface, and being rotatable about an axis, said apparatus comprising:

a generally annular hub having a plurality of raised portions each forming a stop, said hub being rotatable about and movable along said axis;

a plurality of fingers hingedly connected to the outer periphery of said hub, each of said fingers including a second disc clamping surface and a registration engaging surface;

a spring disposed circumferentially around said plurality of fingers for biasing said fingers radially inwardly against said stops such that said second disc clamping surfaces form a ring that contacts said camming surface when said hub is moved along said axis and into engagement with said spindle; and

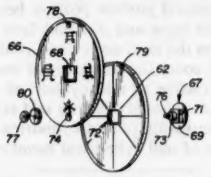
a generally cup-shaped lifter for carrying said hub, said plurality of fingers and said spring and for moving said hub along said axis, whereby when said disc is loaded between said spindle and said hub and said lifter moves said hub along said axis such that said ring contacts said spindle, continued axial movement of said hub causes said ring to expand corresponding to the increasing diameter of said camming surface and wipe the inner periphery of said disc along said camming surface and said registration surface and onto said first disc clamping surface and whereby said spring causes said second disc clamping surface to clamp said disc to said first disc clamping surface, and also serves to positively register said registration engaging surface with said disc registration surface such that substantially all the driving torque associated with said spindle is coupled to said hub.

4,077,237

CODED CHARM DEVICE

Vernon L. Loper, 1995 Winfield Dr., Lakewood, Colo. 80215

Filed Mar. 1, 1976, Ser. No. 662,674
Int. Cl.² A44C *25/00*
U.S. Cl. 63—31 **2 Claims**



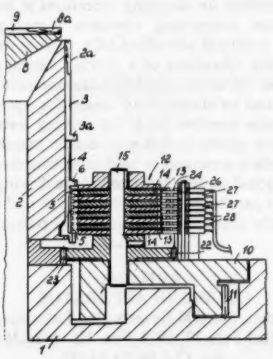
1. As an item of jewelry for wear on the person at positions for prominent display and for viewing by observers, a code annunciator charm device comprising a first support element, a second element disposed in juxtaposition to said support element whereby viewing of one said element is at least partially occluded by the presence of the other, a plurality of code related index markings at spaced positions on the partially occluded element, cooperative means permitting limited relative movement between said first and second elements whereby less than all of said separate index markings are at any one time selectively movable to a non-occluded position for display, said code annunciator charm device further comprising use of at least one coin of the type having an opening through the face thereof when in an as-minted condition as one of said elements to provide said non-occluding display.

4,077,238

NEEDLE SELECTING DEVICE IN A CIRCULAR KNITTING MACHINE

Riccardo Tenconi, Via Tallera, 20, Varese, Italy

Filed Mar. 29, 1977, Ser. No. 782,479
Claims priority, application Italy, Apr. 9, 1976, 22137A/76
Int. Cl.² D04B *15/74*
U.S. Cl. 66—50 B **4 Claims**



1. A needle selecting device in a circular knitting machine of the type having oscillating needle pusher jacks, wherein the

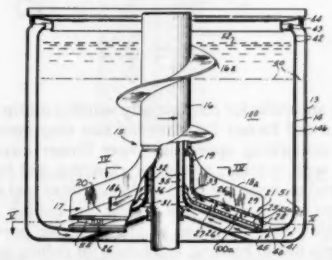
selection is effected by engaging teeth of a toothed selection disk with corresponding pattern butts of respective needle pusher jacks, thus causing the jacks to move into an inoperative position wherein the jacks are not raised and do not lift the overlying needles to a thread pick up position at a given feed, the toothed disk being rotated by a coaxial entraining disk at a rotational speed such as to achieve substantially a rolling action between the needle cylinder and toothed disk, and being angularly displaceable with respect to said entraining disk between an angular position in which the teeth of said toothed disk are capable of engaging corresponding ones of said pattern butts and an angular position in which none of the teeth of said toothed disk engage a pattern butt, the angular displacement being ensured by a lever having a hooked end which can be controllably inserted between the teeth of said toothed disk for temporarily stopping the rotation of said toothed disk with respect to said entraining disk against the bias of an elastic means placed between said toothed disk and said entraining disk, wherein said entraining disk has a plurality of peripheral bosses equal in number to the number of the teeth of said toothed disk and shaped to guide said hooked end to a position releasing said toothed disk, and said hooked end is provided with discrete engagement surfaces for engagement respectively with said bosses and with the teeth of said toothed disk, said engagement surfaces being positioned and configurated to release said toothed disk on completion of the travel of said hooked end as determined by said bosses.

4,077,239

PUMPING AGITATION SYSTEM FOR AN AUTOMATIC WASHER

Clark I. Platt, and Jack F. Clearman, both of St. Joseph, Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Apr. 27, 1976, Ser. No. 680,776
Int. Cl.² D06F *13/02*
U.S. Cl. 68—53 **12 Claims**



1. A washing machine having a tub for containing wash liquid, a basket mounted in the tub for containing items to be washed, pumping agitator means oscillatibly mounted in the basket for oscillatable movement on a vertical axis, said basket having an upwardly inwardly extending lower wall and a central wall upstanding from said lower wall, and the basket being disposed in said tub for rotation on said vertical axis, said agitator means having a lower portion including a pumping means operable when said agitator is oscillated for agitating the basket contents and pumping wash liquid from the tub to the basket and radially outwardly in the basket through said lower portion of said pumping agitator means, and drive means for oscillating said pumping agitator means during a washing cycle,

said basket defining an opening through said central wall thereof affording liquid communication between said tub and said basket, and

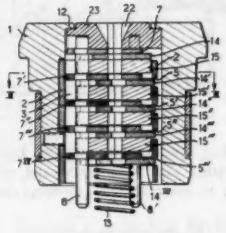
said pumping agitator means including a liquid barrier means for preventing substantial radially-inward liquid flow in the basket under said lower portion of said pumping agitator.

4,077,240

CYLINDER LOCK

Serge Crasnianski, Grenoble, France, assignor to I S A S.a.r.l., Haguenau, France

Filed Sep. 14, 1976, Ser. No. 723,075
Claims priority, application France, Sep. 23, 1975, 75 29046
Int. Cl.² E05B *29/02*
U.S. Cl. 70—360 **10 Claims**



1. A cylinder lock of the type formed by a stator with a cylindrical bore with a rotor mounted in said bore for rotation from a rest position to at least one operative position, under the action of a profiled flat key, said rotor comprising, in flat recesses a plurality of mutually parallel lamellae said lamellae being perpendicular to the axis of the rotor and displaceable in at least one direction transverse to the axis of the rotor so as to engage at their periphery, when the rotor is in its rest position, in grooves formed in the inner surface of the stator, the lamellae being releasable from said grooves by introduction of the key into openings in said lamellae, the positions of said openings in the successive lamellae corresponding to the profile of said key, release of said lamellae being followed by an axial pressure applied to the rotor by the key against the action of a return spring, releasing elements for locking the rotor in its direction of rotation, which elements contact second elements of complementary shape of the stator to enable the lock to be actuated by rotation of the rotor, one end of the rotor being integral with a control member for operating a bolt, wherein it comprises floating lamellae mounted in such a way that they are able to move freely, but to a limit extent, both radially and angularly, so that, in the rest position, they occupy positions radially and angularly offset relative to one another, and wherein the rotor comprises means for guiding the flat key over its entire introduction path into the barrel without any possibility of radial or lateral displacement, said key having complementary profiles along its opposite edges and a tapered end with convex surfaces enabling it to be introduced into disaligned and angularly offset openings of the lamellae so as to unlock them and to return them to their initial locking position by withdrawal of the key.

4,077,241

LOCKING ARRANGEMENT

M. Roy Cohen, E. Warren Rd., East Warren, Vt. 05674; Bruce W. Arrington, 296 Gifford Rd., Westport, Mass. 02790, and William W. Pittendreigh, 30 Pinette St., New Bedford, Mass. 02740

Filed Nov. 9, 1976, Ser. No. 740,194
Int. Cl.² E05B *9/04*
U.S. Cl. 70—371 **4 Claims**

1. An improved arrangement for locking a coin box to a vending machine comprising:

a lock housing;

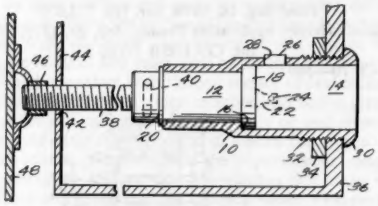
a coin box secured to said housing;

a cylindrical bore within said housing;

a first key-operated cylindrical lock positioned within said bore whereby an end of the lock adapted to receive a key is spaced inwardly from the ends of said housing;

an extension projecting beyond said housing from an end of said first lock opposite the key-receiving end, said exten-

sion being adapted to be removably secured to the machine in accordance with selective actuation of said first lock by the key; and



a second key-operated cylindrical lock removably positioned within said bore in coaxial relationship with the first lock to conceal the key-receiving end of said first lock.

4,077,242

METAL MAGNETIC KEY

Bruce S. Sedley, R.R. 1, Box 96, Koloa, Hi. 96756

Filed Dec. 15, 1976, Ser. No. 750,663

Int. Cl.[2] E05B *19/26*

U.S. Cl. 70—413 **4 Claims**

1. A generally planar metal card key comprising:

a pair of sheets of metallic material,

a planar member of magnetizable material interposed between said sheets and coded with magnetic spots,

means fixedly securing said sheets together along their peripheries and clamping said member between said sheets, one of said sheets being of nonmagnetizable material.

4,077,243

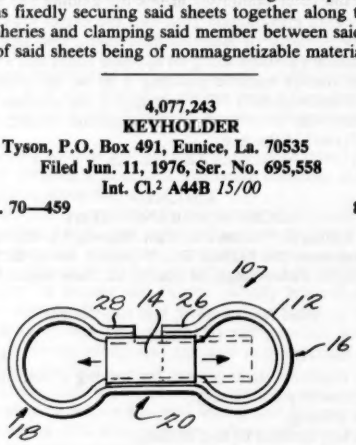
KEYHOLDER

Youree Tyson, P.O. Box 491, Eunice, La. 70535

Filed Jun. 11, 1976, Ser. No. 695,558

Int. Cl.[2] A44B *15/00*

U.S. Cl. 70—459 **8 Claims**



1. A keyholder comprised of a strip of material, said strip being shaped so as to form a body member having two end portions and a central portion, said end portions being joined together along one side of said central portion, said strip having two free end portions which together form the opposite side of said central portion, said free ends being spaced apart so as to define an opening therebetween, wherein each side of said central portion of said body member has been bent inwardly so as to form a narrowed area therebetween, and closure means for closing the opening in the narrowed area of said central portion, said closure means being slidingly retained by the portions of said strip forming said narrowed area wherein said closure means comprises a rectangular shaped block-like member having two long sides and two short sides, groove means for engaging the sides of said narrowed area, said groove means extending along each of said long sides of said block-like member and wherein the length of the side of said narrowed area along which said end portions are joined is equal to the length of said block-like member and the width of the opening defined by said free ends, and the length of each of said free end portions comprising the opposite side of said narrowed area is equal to about one half the length of said block-like member.

4,077,244

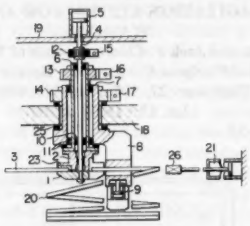
METHOD OF AND APPARATUS FOR CONTINUOUSLY WINDING A RECTANGULAR WIRE

Noboru Umehara, and Hidetoshi Takeshita, both of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 16, 1976, Ser. No. 723,970

Int. Cl.[2] B21D *7/04*

U.S. Cl. 72—129 **17 Claims**



1. An apparatus for continuously winding a strip metal comprising a coil former for clamping said strip metal, said coil former comprising upper and lower former members being formed with notches, means for clamping and bending said strip metal to shape the same to the profile of said coil former, means mounted on the coil former for cutting protrusions which have been produced at the inner side portion of said strip metal due to bending, and means for pulling the bent strip metal out of said coil former.

4,077,245

APPARATUS FOR TRANSPORTING, TREATING AND STORING ARTICLES

Heinrich Bauer; Karl-Heinz Dorner, both of Grevenbroich; Helmut Eberlin, Wyhlen; Hans Kaulen, Grevenbroich; Werner Pazurek, Grenzach-Horn; Heinz Richarz, Grevenbroich; Harro J. Taubmann, Rheinfelden, and Gerhard Wolf, Grevenbroich-Nauenhausen, all of Germany, assignors to Eisenbau Wyhlen AG and VAW Leichmetall GmbH, both of Wyhlen, Germany

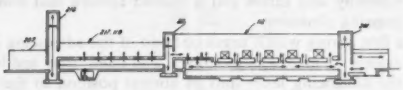
Division of Ser. No. 490,299, Jul. 22, 1974, Pat. No. 3,892,113, which is a division of Ser. No. 399,182, Sep. 20, 1973, Pat. No. 3,993,201. This application Aug. 2, 1976, Ser. No. 711,079

Int. Cl.[2] B21B *39/00*

U.S. Cl. 72—250 **2 Claims**

1. Apparatus for manipulating heavy commodities, especially convoluted bulky metallic band stock or the like, in a plant wherein the commodities are treated at several stations of at least one production line having a receiving end and a discharge end and being located at a first level, comprising first

and second commodity storing magazines respectively provided at said receiving and discharge ends of the production line, said production line also comprising a furnace adjacent said second magazine, a battery of rolling mills and a depository for commodities adjacent to each of said rolling mills; and a plurality of transporting devices arranged to transport the commodities between said magazines and to and from said



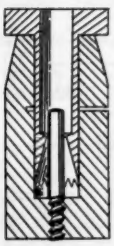
stations on at least one second level which is located above or below said first level while holding said commodities against swinging so that they can be rapidly accelerated or decelerated, said transporting devices including at least one lifting device movable along and at a level below said rolling mills and arranged to deliver to said depositories commodities which are withdrawn from said first magazine.

4,077,246

PERCUSSION CAP FORMING TOOL

Gary Lee Trammel, 5540 Walnut Ave., Long Beach, Calif. 90805

Filed Jul. 28, 1976, Ser. No. 709,279
Int. Cl.² B21D *51/54, 45/00*
U.S. Cl. 72—328 **3 Claims**



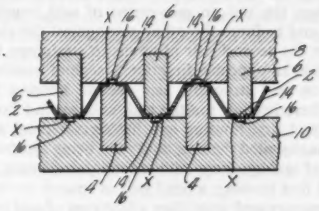
1. A tool for forming percussion caps from a metal sheet in one operating cycle, comprising a cutting block and a cutter which are reciprocable toward and away from engagement with each other, said cutting block including a stationary mandrel which is centered within the cylindrical walls of a female cutter guide, said mandrel extending to a feeding slot which perpendicularly traverses said cutter guide, said cutter being cylindrical with multiple cutting teeth along its edge periphery and including an internal forming cone, the larger end of said forming cone originating at said cutting teeth and tapering inwardly within the cutter to a smaller orifice diameter and terminating in a shoulder at that point, said shoulder being formed by the junction of the small-orifice end of said forming cone and a larger cap exit passage to the exterior of the cutter, said cutter being snugly slidable within said cutter guide thereby properly aligning and positioning the mating surfaces of the tool, said cutting teeth acting during tool engagement to uniformly wrinkle and cut a disc from a metal sheet positioned in said feeding slot, said mandrel then cooperating with said forming cone to form said disc into a percussion cap therebetween, said percussion cap being formed onto the tip of said mandrel and projected past the end of said forming cone into said cap exit passage prior to the bottoming of the mechanism, said percussion cap being pulled free of said mandrel by said shoulder upon disengagement of the tool components.

4,077,247

METHOD AND APPARATUS FOR IMPROVING THE FORMABILITY OF SHEET METAL

Dennis C. Stewart, West Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Filed Sep. 30, 1975, Ser. No. 618,085
Int. Cl.² B21D *28/26*
U.S. Cl. 72—325 **2 Claims**



1. A method for forming a projection having an annular shoulder at its end extending inwardly into an annular end surface with a center perforation therein in sheet material capable of being deformed with a die pin while reducing material thinning in said sheet material adjacent said annular shoulder by the contacting end of the die pin comprising the steps of:

(a) forming a perforation in said sheet material,

(b) forming a die pin having an end surface larger than the perforation,

(c) placing the end of said die pin over the perforation so that the end of the die pin covers and extends arond the perforation,

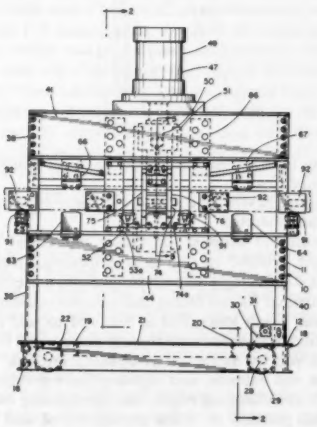
(d) moving said die pin relative to said sheet material to form a projection in said sheet material having an annular shoulder and an end surface while expanding said perforation in said end surface increasing the flow of material over the edge of the end of the die pin at the annular shoulder to decrease material thinning at that location while leaving an annular end surface extending inwardly from said annular shoulder.

4,077,248

RAIL STRAIGHTENING PRESS

Karl Lewis Lindmark, Rockford, Ill., assignor to Chemetron Corporation, Chicago, Ill.

Filed Jan. 3, 1977, Ser. No. 756,197
Int. Cl.² B21D *7/06*
U.S. Cl. 72—389 **7 Claims**



1. A rail straightening press comprising: a support structure;

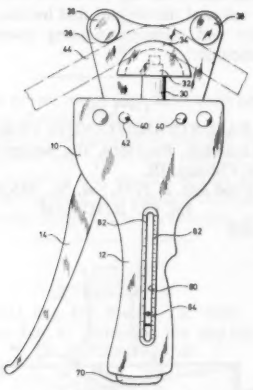
a housing slidably mounted on said structure, said housing having an opening therethrough for the rail, said housing having a pair of opposing rams mounted thereon, said rams being located on opposite sides of said opening; a first pair of spaced anvils mounted on said structure and straddling a ram; a second pair of spaced anvils mounted on said structure and straddling the other ram; means connected to a side of said housing adjacent a ram for reciprocating said housing to force a ram against the rail, and the rail against said first pair of anvils to straighten the rail on movement of said housing in one direction, and to force the other ram against the rail, and the rail against the second pair of anvils to straighten the rail on movement in an opposite direction; a second housing slidably mounted on said structure, said second housing having an aperture therethrough for the rail, said second housing surrounding said first housing and having a second pair of opposed rams mounted thereon, said rams being located on opposite sides of said aperture, said second pair of rams extending inside said first housing; a third pair of spaced anvils mounted on said structure and straddling a first ram of said second pair of rams; a fourth pair of spaced anvils mounted on said structure and straddling a second ram of said second pair of rams; and second means connected to a side of said second housing adjacent a first ram of said second pair of rams for reciprocating said housing to force said first ram against the rail and against the third pair of anvils on movement in one direction to straighten the rail and said second ram against the rail and the fourth pair of anvils on movement in another direction.

4,077,249

CUTTING OR BENDING TOOL

Erich K. Schmitter, Industriestrasse 5, 6369 Dortelweil b. Ffm., Germany

Filed Jan. 26, 1976, Ser. No. 652,322
Claims priority, application Germany, Jan. 27, 1975, 2503131
Int. Cl.² B21D *9/08*
U.S. Cl. 72—389 **18 Claims**



1. A tool for exerting bending force on an elongated workpiece, comprising:

a. a housing having one or more counter-pressing elements attached thereto;

b. a thrust rod adapted for sliding movement within said housing relative to said counter-pressing elements, said thrust rod having a smooth surface and a pressing element mounted on its end facing said counter-pressing elements;

c. a sprag being journalled at one end to said housing for pivoting movement with respect thereto and fitted on said thrust rod by means of an opening through which said thrust rod extends, said opening having opposite upper and lower clamping edges, said sprag being adapted in its normal position to block movement of said thrust rod away from said counter-pressing elements;

d. an advancing lever fitted on said thrust rod by means of an opening through which said thrust rod extends, said opening having opposite upper and lower clamping edges which grip against said thrust rod when said advancing lever is in a normal position;

e. a hand lever pivotably connected to said housing and adapted upon movement to advance said advancing lever in its normal position toward said counter-pressing elements and to release said sprag from its normal position, whereby said thrust rod is moved toward said counter-pressing elements;

f. a first spring which urges one end of the advancing lever against an inner end section of said hand lever and biases the advancing lever into its normal position so that said upper and lower clamping edges of the opening of the advancing lever engage against said thrust rod with a tilting action;

g. a second spring positioned between and urging apart said advancing lever and said sprag, said second spring urging the sprag into its normal position, wherein said upper and lower clamping edges of its opening are pressed against said thrust rod with a tilting action; and

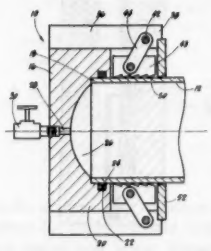
h. release means on said housing for simultaneously unjamming said sprag and said advancing lever, whereby the bending force exerted by said thrust rod can be released.

4,077,250

PIPE CLOSURE APPARATUS

William E. Wesch, Box 94162, Houston, Tex. 77018

Filed Feb. 16, 1977, Ser. No. 768,957
Int. Cl.² F16L *55/10*; G01M *3/00*
U.S. Cl. 73—49.8 **10 Claims**



1. A test closure apparatus for affixing to the open end of a pipe or fitting for hydrostatic pressure testing thereof comprising:

an end closure plate having a shoulder adapted to abut against the end of a pipe to be tested; and

external pipe gripping means joined to said end closure plate which pipe gripping means include serrated gripper means for grabbing the exterior of the pipe and which pipe gripping means incorporates a rotatable mounting means which tends to jam said gripper means against the pipe more firmly as said end closure means is forced from said pipe.

4,077,251

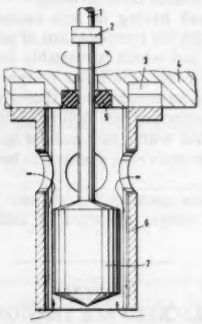
VISCOSITY MEASURING DEVICE AND METHOD

Horst H. Winter, Sommerhaldenweg 90, Stuttgart, Germany

Filed Jan. 13, 1977, Ser. No. 759,156
Claims priority, application Germany, Jan. 16, 1976, 2601487
Int. Cl.² G01N *11/14*
U.S. Cl. 73—59 **5 Claims**

1. In the known device for determining the viscosity of fluids which includes a housing and a rotor mounted coaxially within said housing so that an annular shearing gap is left between the exterior surface of said rotor and the interior surface of said housing, the improvement which comprises providing narrow

and shallow grooves in at least one of said surfaces, the dimensions of said grooves being small as compared to the total



surfaces so that a small axial flow of the fluid to be tested is effected by said grooves while the fluid flow pattern in a circumferential direction is left essentially unchanged.

4,077,252

APPARATUS FOR THE OPTO-ELECTRICAL DETERMINATION OF A MEASURED VALUE

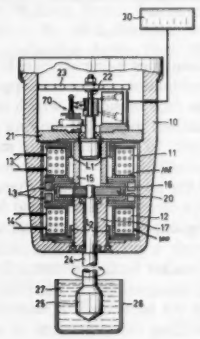
Theo Stutz, Bassersdorf, and Georg Zemp, Zurich, both of Switzerland, assignors to Contraves AG, Zurich, Switzerland

Filed Feb. 22, 1977, Ser. No. 771,035

Claims priority, application Switzerland, Mar. 15, 1976, 3226/76

Int. Cl.² G01N *11/14*; G01B *11/26*

U.S. Cl. 73—59 **10 Claims**



1. An apparatus for the opto-electrical determination of a measured magnitude at a viscosimeter, especially at a rotational viscosimeter, comprising:

a motor containing a stator and a rotor;

a rotatable body immersible in a medium, the viscosity of which is to be measured;

means for connecting the rotatable body with said rotor of said motor;

a pivotably mounted shaft rigidly connected for rotation with said stator of said motor;

a torsion spring for exerting a restoring force upon said pivotably mounted shaft;

means for obtaining a series of light pulses independent of the measured magnitude and a further series of light pulses dependent upon said measured magnitude;

said means for obtaining said respective series of light pulses comprising:

a first reflector provided for said pivotably mounted shaft;

at least one rotatably driven second reflector;

a drive motor for driving said rotatably driven second reflector about an axis of rotation;

said rotatably driven second reflector being arranged in spaced relationship from and essentially parallel to the axis of said pivotably mounted shaft;

a stationary optical block cooperating with said rotatably driven second reflector;

said optical block comprising a light source for producing a light beam directed to impinge upon said rotatably driven second reflector and a light receiver for processing the light pulses.

4,077,253

APPARATUS AND METHOD FOR THE IMAGING OF THE INTERNAL STRUCTURE OF A THREE-DIMENSIONAL SOLID AND/OR LIQUID OBJECT

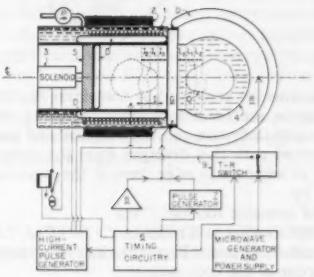
Ronald D. Grisell, Physiology Dept. U.T.M.B., Galveston, Tex. 77550

Continuation-in-part of Ser. No. 473,812, May 28, 1974, abandoned. This application Apr. 30, 1975, Ser. No. 573,044

Claims priority, application Germany, Jun. 1, 1973, 2328119

Int. Cl.² G01N *29/04*

U.S. Cl. 73—629 **11 Claims**



1. A process for the multiple-layer, layer-by-layer reconstruction of the internal structure of a solid, liquid or solid-liquid object comprising: exciting said object with

ultrasonic waves during a time interval where ΔT determines thickness of an i-th object layer (L_i) as the time taken for said waves to pass through said layer, at an i-th step of said process, depending recursively on identical steps numbered **1, 2, . . . *i*-1** having been performed previously, such that a coherent, monochromatic wave-pulse pair (P_i, P_i') generated in standard ultrasonic generating means outside said object pass simultaneously through and define said i-th object layer during said time interval and generate two additional pulses in said i-th layer: one (R_i) transmitting information about absorptivity in said i-th layer, and the second (T_i) transmitting information about propagation velocity or refractivity in said i-th layer,

said wave and pulse ($P_i P_i'$) arriving at said i-th object layer after the pulse (P_i) has been conjugated in a conjugator operated as a reversal medium which returns the conjugate of an incident wave,

and in which said additional two pulses activate an image medium by having particles responsive to the activation and further responsive to the additional two pulses to constitute a recording means in the image medium wherein said absorptivity and refractivity information are used to reconstruct the acoustic impedance three dimensional analog of the object,

said image medium, reversal medium, generating means and object being sonically coupled to transmit and transfer said ultrasonic waves and pulses between said media, generating means and object, said image media being coupled to a magnet coil and a microwave source with

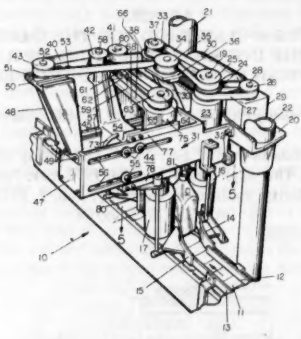
means for energizing said coil and source to activate said media for recording.

4,077,254

IMPACT SIMULATION APPARATUS

Benjamin Mercer, Jr., Toledo, Ohio; Darius O. Riggs, Ottawa Lake, Mich., and Charles G. Vogel, Toledo, Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Apr. 25, 1977, Ser. No. 790,503
Int. Cl.² G01N *3/08*
U.S. Cl. 73—94 **12 Claims**



1. Apparatus for testing glass containers for structural defects, wherein the containers are transported on a moving conveyor with their axes generally vertical and guided along a predetermined path that diverges from the centerline of the conveyor to adjacent an edge thereof, the improvement characterized by:

a pair of rotatable rollers;

means for rotating said rollers;

means mounting said rollers with their axes vertical adjacent said edge of the conveyor;

means connected to one of said rollers for adjusting the relative spacing of said rollers;

a vertical hinge;

means mounting the adjustable roller for movement about said hinge; and

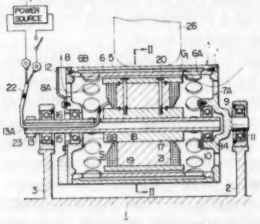
means biasing said one roller in the direction of the other with a preselected force.

4,077,255

ROLLER TYPE CHASSIS DYNAMOMETER

Tadao Murakami, Katsuta, Japan, assignor to Hitachi, Ltd., Japan

Filed Oct. 19, 1976, Ser. No. 733,796
Claims priority, application Japan, Oct. 24, 1975, 50-127457; Jun. 28, 1976, 51-75519
Int. Cl.² G01L *5/13*
U.S. Cl. 73—117 **8 Claims**



1. A roller type chasis dynamometer comprising:

a hollow cylindrical roller driven by means of a material to be inspected and having at least one end which is rotatably supported wherein said hollow roller includes at least two concentric cylindrical members, with an annular clearance being defined therebetween;

a rotatable shaft having its axis extending in concentric alignment with the rotational axis of said roller and having at least one end which is rotatably supported relative to said hollow roller, the outer peripheral surface of said shaft defining an annular space therearound with the inner peripheral surface of said hollow roller;

means positioned within said annular space and secured on said shaft for absorbing a power to be transmitted to said roller; and

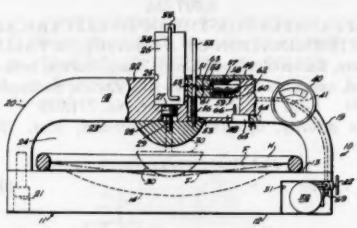
detecting means associated with said rotatable shaft for detecting a power absorbed in said power absorbing means.

4,077,256

STRINGED RACKET FACE TENSION MEASURING DEVICE

Bruce Lee Hollander, 1025 Tyler St., Hollywood, Fla. 33020

Filed Jan. 10, 1977, Ser. No. 758,190
Int. Cl.² G01L *5/08*
U.S. Cl. 73—145 **5 Claims**



1. A face tension measuring device for stringed rackets comprising, in combination, means for supporting one side of a stringed racket the face tension of which is to be measured, a face abutment member, means for moving said face abutment member with respect to said supporting means in a direction substantially perpendicular with respect to the racket face at the other side of the supported head thereof, and means for measuring the force required to move said face abutment member in the abutting engagement direction with respect to the racket face through a predetermined distance of sideward deflection of said racket face, said means for moving said face abutment member comprising a rod member connected to said abutment member for movement in unison therewith, an energy source controlling the movement of said rod member in the inward or racket face abutting direction, and means controlled by reactive or back pressure being exerted upon said energy source through said rod member upon said face abutment member first moving into abutting contact with said racket face for automatically limiting further face deflecting movement of said face abutment member to said predetermined distance.

4,077,257

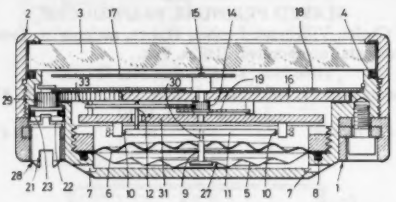
DEPTH GAUGE

Karl Leemann, Hallwil, Switzerland, assignor to Etablissement Financier et Industriel Intersub, Vaduz, Switzerland

Filed Mar. 4, 1977, Ser. No. 774,510
Claims priority, application Switzerland, Mar. 12, 1976, 3122/76
Int. Cl.² G01F *23/16*
U.S. Cl. 73—300 **6 Claims**

1. In a depth gauge of the type wherein a component deformable under the effect of water pressure is connected to transmission means for transmitting the extent of said deforma-

tion to an indicator device, the improvement comprising a said deformable component composed of at least two subcomponents, the first of said subcomponents starting deformation at a first pressure and a second of said subcomponents starting



deformation at a second pressure which is greater than said first pressure, said subcomponents being linked together to provide a composite deformation which varies non-linearly with variation in said water pressure.

4,077,258

METHOD OF DETERMINING LIQUID LEVEL IN A PETROLEUM CRACKING REACTOR

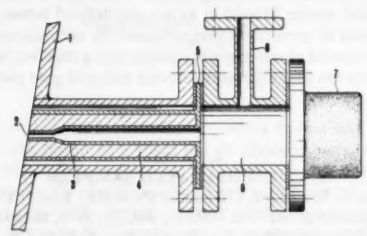
Seiichi Suzuki, No. 62-1, Sagiuchi, Nishiki, Iwaki, Fukushima; Masahiro Yamaguchi, No. 55-1, Sekishita, Nishiki, Iwaki, Fukishima; Saburo Takahashi, No. 81-1, Kamata, Nishiki, Iwaki, Fukushima, and Keiji Nagayama, No. 167-24, Kubotagozenzaki, Nakoso, Iwaki, Fukushima, all of Japan

Filed Nov. 16, 1976, Ser. No. 742,101

Claims priority, application Japan, Nov. 25, 1975, 50-140238

Int. Cl.[2] G01F *23/16*

U.S. Cl. 73—302 **1 Claim**



1. In a method of determining the liquid level of content material in a reactor in which a heavy petroleum oil is subjected to a thermal cracking, by measuring the liquid pressure at a certain point below said liquid level, the improvement comprising:

(a) providing chambered means for connection to a through-hole of the reactor for introducing the petroleum oil into the reactor;

(b) introducing said heavy petroleum oil through said chambered means into said content material at a linear velocity of not less than 5 cm/sec from the through-hole provided at a certain predetermined location in a side of said reactor while measuring the pressure at said through-hole through which said heavy petroleum oil is introduced; and

(c) calculating the liquid pressure of said content material at the location of said through-hole from the introducing rate and pressure of said heavy petroleum oil.

4,077,259

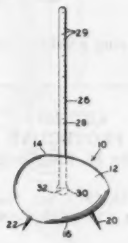
EGG TEMPERATURE INDICATING DEVICE

Sidney Foster, R.R. #2, Box 20, Slayton, Minn. 56172

Filed Nov. 2, 1976, Ser. No. 738,076

Int. Cl.[2] G01K *1/02, 1/14*

U.S. Cl. 73—343 R **8 Claims**



1. An egg temperature indicating device adapted to be supported to stand in a cooking pan of water containing at least one cooking egg and which comprises a body having the same general shape and the interior portion constructed to be substantially the same density as the average uncooked egg, and a thermometer having a bulb containing temperature indicating liquid, and a shaft marked with temperature gradations along its entire length extending vertically from and integrally forward with said bulb, said bulb being generally centrally located in said body, said shaft of said thermometer in turn vertically projecting from said body so that said temperature gradations may be observable and the cooked egg immediately removed at a predetermined temperature.

4,077,260

OPTICALLY ACTIVE CYANO-BIPHENYL COMPOUNDS AND LIQUID CRYSTAL MATERIALS CONTAINING THEM

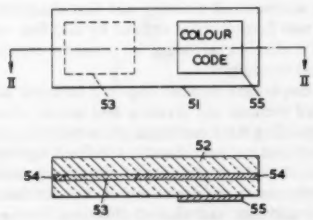
George William Gray, Cottingham, and Damien Gerard McDonnell, Hull, both of England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Aug. 20, 1976, Ser. No. 716,300

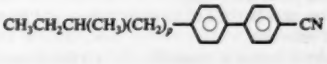
Claims priority, application United Kingdom, Sep. 30, 1975, 36211/75

Int. Cl.[2] C09K *3/34;* **G02F** *1/13;* **G01K** *11/16*

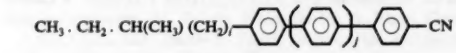
U.S. Cl. 73—356 **18 Claims**



1. A liquid crystal material consisting essentially of an admixture of (1) one or more optically active biphenyl compounds having a positive optical rotation angle and having the formula:



where *p* is an integer having a value of from 0 to 5 inclusive and (2) at least one optically active cholesterogenic compound different from (1) having a positive optical rotation angle and having the formula:



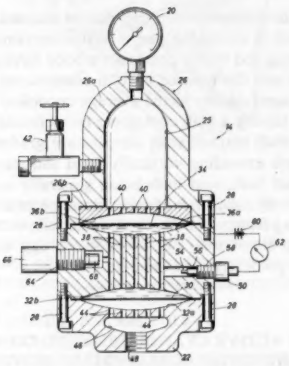
where *i* is an integer having a value from 0 to 5 inclusive and *j* is 0 or 1.

4,077,261

INSTRUMENT PROTECTIVE APPARATUS

Sandiford Ring, and John H. Ring, both of P.O. Box 14666, Houston, Tex. 77021

Filed Apr. 13, 1977, Ser. No. 786,969
Int. Cl.² G01L *7/08*
U.S. Cl. 73—706 **20 Claims**



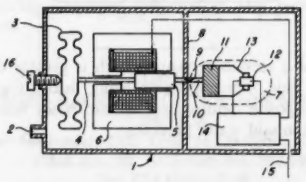
11. A fluid flow system comprising:
a fluid conduit;
a process fluid flowing through said conduit;
a protective device connected to said conduit and comprising:
a body having first, second and third sections, said second section being disposed beween said first and third sections;
a first chamber formed between said first and second sections;
a second chamber formed between said second and third sections;
a first diaphragm member disposed between said first and second sections and dividing said first chamber, the portion of said first chamber defined by said first section and said first diaphragm being in pressure communication with said conduit;
a second diaphragm member disposed between said second and third sections and dividing said second chamber;
means providing fluid communication between portions of said first and second chambers defined by said second section and said first and second diaphragm members, said fluid communication means and said communicating portions of said first and second chambers forming a force transfer liquid reservoir;
a pressure reaction fluid reservoir in said third section of said body at least partially defined by the portion of said second chamber defined by said third section and said second diaphragm means;
a pressure reaction fluid substantially filling said pressure reaction fluid reservoir;
a force transfer liquid substantially filling said force transfer liquid reservoir;
and detector means associated with said force transfer liquid reservoir for detecting changes in the electrical characteristics within said force transfer liquid reservoir.

4,077,262

SLAVED PRESSURE TRANSDUCER

Jean Cholet, Villeneuve-Loubet, France, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 1, 1976, Ser. No. 737,459
Claims priority, application France, Nov. 4, 1975, 75 33633
Int. Cl.² G01L *9/10*
U.S. Cl. 73—701 **12 Claims**



1. Servo pressure pickup apparatus comprising a sealed housing having pressure inlet means, aneroid capsule means mounted in said housing in communication with said inlet means; electromagnet means in said housing; physical displacement measuring means disposed in said housing for generating an electrical displacement signal corresponding to the pressure being measured; electronic circuit means in said housing for electrically coupling said displacement signal to said electromagnet means; said electromagnet means including core member means coupled to a wall of said capsule means and to said displacement measuring means for movement thereof in one sense in response to movement of said wall of said capsule means to cause said displacement measuring means to generate a displacement signal coupled by said electronic circuit to said electromagnet means for generation of a force causing movement of said core member means in an opposite sense; wherein said displacement measuring means comprises a Hall-effect differential device located in an air gap defined between two pole pieces of permanent magnet means in said housing, said wall movement of said capsule means causing relative displacement between said differential device and said pole pieces.

4,077,263

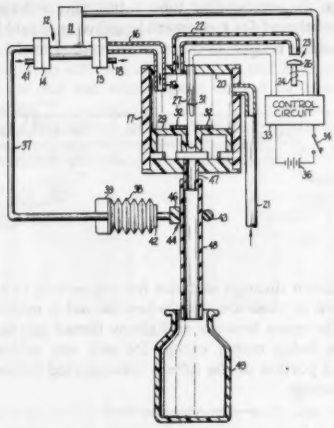
VACUUM OPERATED SAMPLER

Harrison D. Brailsford, 670 Milton Point Rd., Rye, N.Y. 10580

Continuation of Ser. No. 600,211, Jul. 30, 1975, abandoned.
This application Aug. 2, 1976, Ser. No. 710,709
Int. Cl.² G01N *1/14*
U.S. Cl. 73—421 B **9 Claims**

1. A liquid sampler comprising:
A. a vacuum pump;
B. a motor connected to operate said pump;
C. a metering chamber;
D. connection means connecting said chamber to said pump to be evacuated thereby;
E. an inlet tube connected to said chamber to pass liquid from a source to said chamber when said chamber is evacuated;
F. air inlet means for said chamber;
G. an outlet for said chamber to allow liquid in said chamber to drain into a sample receptacle;
H. a valve connected to said outlet to allow said liquid to flow therethrough when said valve is open and to prevent air from flowing therethrough when said valve is closed; and

I. switching means responsive to the accumulation of a predetermined quantity of liquid in said chamber to stop



said pump and allow said liquid to flow out of said chamber through said outlet.

4,077,264

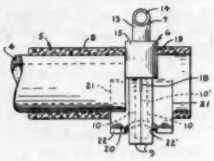
CONNECTORS FOR MOLTEN METAL SAMPLERS

Robert F. McDevitt, P.O. Box 551, Ogden Dunes, Portage, Ind. 46368

Division of Ser. No. 720,697, Sept. 7, 1976. This application Feb. 15, 1977, Ser. No. 768,710

Int. Cl.[2] G01N *1/12*

U.S. Cl. 73—425.4 R **12 Claims**



1. An elongated nonmetallic connector having one extremity for attachment to a lance and an opposite extremity provided with a first opening for receiving one end of an elongated device for sampling a liquid and with a second opening located opposite the first opening for receiving an opposite end of said device for locating the latter in an operative position for use substantially transverse to the longitudinal axis of said connector.

4,077,265

ALCOHOL TESTERS

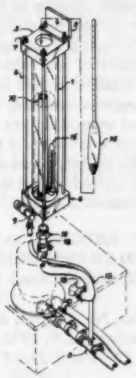
Harvey Alec Strain, 715 E. Center, Duncanville, Tex. 75116

Filed Feb. 20, 1976, Ser. No. 659,949

Int. Cl.[2] G01N *9/10*

U.S. Cl. 73—445 **3 Claims**

1. A device for continuously measuring the specific gravity of an alcohol-water mixture in a lithographic press comprising a test reservoir, means connecting said test reservoir to the main circulating reservoir and water pan of said press, means for controlling and minimizing the turbulence of said input mixture flow into said test reservoir, means within said test reservoir for maintaining a predetermined mixture level, means for measuring the temperature of said mixture within said test reservoir and a free floating hydrometer, means within said test reservoir for measuring the specific gravity of said mixture



whereby the temperature measurement is used to correct the specific gravity measurement of said mixture.

4,077,266

DEVICE FOR DETECTING ANGULAR ACCELERATIONS AND DECELERATIONS OF A VEHICLE ROAD WHEEL

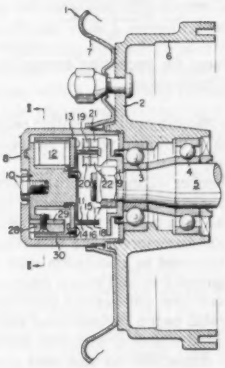
Hiroshi Takamatsu, Ooi; Makoto Sato, Kamifukuoka; Yoshitaka Miyagawa, Kawagoe; Yutaka Arai, Shiki, and Etsuo Fujii, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 13, 1977, Ser. No. 787,266

Claims priority, application Japan, Apr. 15, 1976, 51-41841

Int. Cl.[2] G01P *15/08*

U.S. Cl. 73—517 A **6 Claims**



1. A device for detecting angular accelerations and decelerations of a vehicle road wheel comprising a first shutter member of cylindrical shape secured coaxially to a rotating member of a vehicle, which rotates with said vehicle road wheel, and having a cylindrical side wall formed therethrough with a plurality of circumferentially equispaced light-beam passage holes, a sensor weight mounted on said rotating member through damping means for limited angular displacement relative thereto, a second shutter member of cylindrical shape secured to said weight in coaxial relation with said first shutter member, said second shutter member having a cylindrical side wall formed therethrough with a plurality of light-beam passage holes corresponding to said first-mentioned holes in said first shutter member, said last-mentioned holes being circumferentially equispaced at the same interval as that of said first-

mentioned holes and arranged normally out of registry therewith, a pair of light-beam emitting and receiving means fixedly mounted on a non-rotating member of the vehicle in radially aligned, spaced and opposite relation to each other with said first and second shutter members interposed therebetween, wherein when said sensor weight is caused, due to an angular acceleration or deceleration of said wheel exceeding a prescribed value, to rotate relative to said rotating member at a predetermined certain angle of rotation, said light-beam passage holes in said first and second shutter members are placed into registry with each other so that said light-beam receiving means receives light beam emitted from said light-beam emitting means to produce a desired output signal.

4,077,267

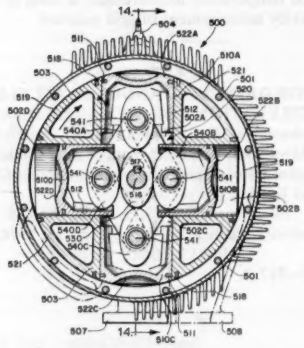
FLUID TRANSDUCER

Henry Schottler, 346 SE. Verada Ave., Port St. Lucie, Fla. 33452

Continuation-in-part of Ser. No. 430,332, Jan. 2, 1974, Pat. No. 3,971,259. This application Jul. 9, 1976, Ser. No. 704,059

Int. Cl.² F16H *21/16*

U.S. Cl. 74—25 **13 Claims**



1. A fluid transducer for imparting energy to or receiving energy from a fluid comprising:

a housing;

a cylinder block rotatably mounted within said housing, said block including a cylinder with a reciprocatory piston mounted therein;

a first elliptical member stationary with respect to said housing and having selected major and minor diameters;

a second elliptical member having substantially the same major and minor diameters as the first elliptical member and rotatably mounted in association with said piston to rotate and reciprocate as said piston reciprocates;

means to retain said first and second elliptical members in engagement as said piston reciprocates; and

said first and second elliptical members further being arranged in said transducer so that said second member rotates in said engagement with said first elliptical member with constant angular velocity as said piston reciprocates whereby said transducer transmits motion between said piston and said rotatable cylinder block.

4,077,268

GARAGE DOOR OPERATOR

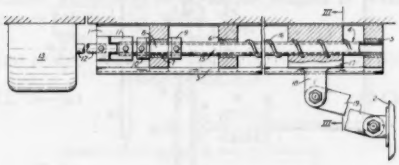
John W. Hill, 1350 Graham Rd., Mansfield, Ohio 44903

Filed Jul. 14, 1976, Ser. No. 705,294

Int. Cl.² F16H *27/02*

U.S. Cl. 74—89.15 **2 Claims**

1. A garage door operator comprising a horizontal tubular housing provided in its bottom with a slot extending lengthwise thereof, a metal tube several feet long inside said housing extending lengthwise thereof above said slot, bearings in the housing supporting the opposite ends of said tube, reversible means at one end of said housing for rotating the tube, a wire wound helically around the tube and welded thereto to form a screw thread between said bearings, said screw thread being spaced from the surrounding tube, a traveling nut encircling said tube and thread for movement lengthwise of said housing when the tube is rotated, and means connected to the nut and



extending down through said slot for connection to a garage door to open or close the door when the nut is moved along said tube, the space between said screw thread and surrounding housing being empty except for said nut, whereby the wire-wound portion of the tube is unsupported between said nut and bearings.

4,077,269

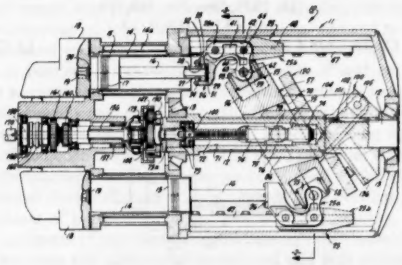
VARIABLE DISPLACEMENT AND/OR VARIABLE COMPRESSION RATIO PISTON ENGINE

Robert Hodgkinson, San Diego, Calif., assignor to Lang Research Corporation, Suisun, Calif.

Filed Feb. 26, 1976, Ser. No. 661,550

Int. Cl.² F16H *23/00;* F04B *1/12;* F01B *1/06*

U.S. Cl. 74—60 **12 Claims**



1. In a machine having a reciprocating piston-drive shaft-swash plate construction wherein reciprocating motion of the piston is translated into rotary motion of the drive shaft or vice versa, said swash plate being mounted coaxially on the drive shaft and at an angle to a plane perpendicular to the axis of the drive shaft, the improvement which comprises:

a. a stationary linear guide fixed to the frame,

b. linking means between the free end of the piston rod and the linear guide, said linking means acting to confine the piston rod to linear movement and being connected at one end to the free end of the piston rod,

c. said swash plate being formed with a circular circumferential groove concentric to the drive shaft,

d. a slide member slideable in said groove and

e. means connecting said slide member to the other end of said linkage.

4,077,270

LOCKING, SANITARY HUB

David W. Mattos, 1501 Stone Creek Dr., San Jose, Calif. 94123

Filed Feb. 10, 1977, Ser. No. 767,361

Int. Cl.² F16H *7/22*

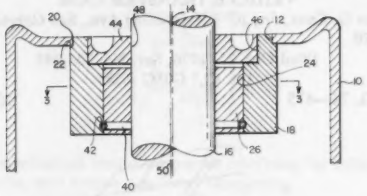
U.S. Cl. 74—230.4 **12 Claims**

1. A pulley hub for mounting on a rotatable sanitary conveyor shaft comprising a cylindrical pulley housing having a

rotational axis coincident with the rotational axis of the shaft, at least one end of the housing having a cylindrical opening concentric with the rotational axis of the housing,

a cylindrical hub for attaching the housing to the shaft, the outer circumference of the hub being sealed to the lip of the housing opening, the hub having an axial bore therethrough to accommodate the shaft and having a counter-bore at one end which opens toward the exterior of the housing,

a closure ring having an outer diameter slightly less than the



diameter of the hub counter-bore such that the closure ring seats snugly within the counter-bore, the closure ring further having a bore to snugly accommodate the shaft, and wherein

the closure ring bore and the hub counter-bore are eccentric to the rotational axis such that counter-rotation of the closure ring with respect to the hub counter-bore in which it is seated jams the outer circumferential surface of the closure ring against the inner, annular surface of the counter-bore to effect a complete liquid tight seal between the surface of the shaft and the housing opening.

4,077,271

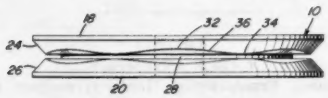
DRIVE POWER TRANSMISSION ELEMENT

Frederic M. Mathews, Lumberton, N.C., assignor to Walter M. Mathews and Bertha B. Mathews, both of Lumberton, N.C., a part interest to each

Continuation-in-part of Ser. No. 551,116, Feb. 19, 1975, abandoned, which is a continuation-in-part of Ser. No. 304,967, Nov. 15, 1972, abandoned, which is a continuation-in-part of Ser. No. 200,976, Nov. 22, 1971, abandoned. This application Jun. 30, 1975, Ser. No. 591,941

Int. Cl.² F16H *55/36*

U.S. Cl. 74—230.24 **2 Claims**



1. A drive power transmission element comprising a generally circular wheel adapted to be rigidly connected to an axle for rotational movement about an axis, said wheel including a generally V-shaped peripheral recess defined by a pair of radially outwardly diverging smooth surfaces terminating at the periphery of the wheel, the radially inner periphery of the recess having a radially extending peripheral groove communicating therewith for receiving a flexible, compressible filament, said groove being defined by a pair of spaced walls and an inner shoulder concentric with the periphery of the wheel and means incorporated into the groove to provide a driving connection between the wheel and filament, said means including a plurality of equally spaced circumferentially extending impressions in each wall of the groove, said impressions being arranged in aligned pairs including a minor constriction area having wall portions spaced apart a minimum distance and a major constriction area having a pair of opposed curved walls spaced apart a major dimension with the area between the major constriction and the minor constriction being defined by opposed, smooth, radially curved wall surfaces curving circumferentially inwardly in the line of circumference of the wheel toward the minor constriction area for compressing the filament to increase the density thereof adjacent the minor constriction area for locking the filament and wheel in relation to each other when a load is transmitted therebetween.

4,077,272

DEVICE FOR THE AUTOMATIC REGULATION OF THE TENSION OF A CRENELLATED TIMING BELT

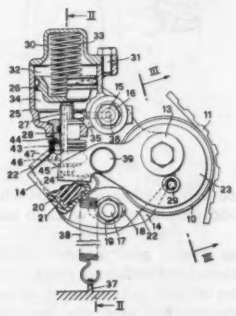
Giuseppe Busso, Milan, Italy, assignor to Alfa Romeo S.p.A., Milan, Italy

Filed Aug. 3, 1976, Ser. No. 711,505

Claims priority, application Italy, Aug. 7, 1975, 26189/75

Int. Cl.² F16H *7/12*

U.S. Cl. 74—242.1 FP **6 Claims**



1. A device for the automatic regulation of the pull of a toothed timing belt mounted on pulleys of an internal combustion engine equipped with a forced-lubrication circuit, comprising a belt-tightening member defined by a roller mounted for rotation on a pin which is eccentrically borne by a member which is integral with a supporting element affixed to an engine block of said engine, said pin having a radial extension on which resilient means are active characterized in that the member is pushed concurrently by a first resilient means and by a second resilient means, a piston, movable within a chamber communicating with the engine lubrication circuit, acting against said first resilient means.

4,077,273

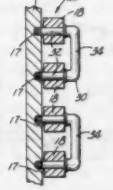
SUPPORTED PIN-TYPE GEAR STRUCTURE

Merritt A. Osborn, 8706 Cedar Rd., Chesterland, Ohio 44026

Filed Aug. 19, 1976, Ser. No. 715,988

Int. Cl.² F16H *1/06*

U.S. Cl. 74—415 **5 Claims**



1. A gear member comprising a support element having a flat face thereon,

a plurality of pin means, each having one end secured to said support element and extending from said flat face thereof,

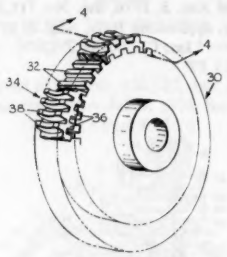
said pin means being radially positioned and circumferentially spaced from each other to define a circular pattern, and link means inter-connecting the free end of each pin means with the free end of both adjacent pin means whereby to define a gear member.

4,077,274

WORM WHEEL

William J. Johnson, Norwell, Mass., assignor to Boston Gear Inc., Quincy, Mass.

Filed Sep. 10, 1975, Ser. No. 612,161
Int. Cl.² F16H *1/16, 1/20, 55/12, 55/30*
U.S. Cl. 74—425 **7 Claims**



1. An improved gear member of the type which is capable of engaging a second gear member, wherein said improvement comprises:

a base portion of said gear member which is made of a strength material and includes a plurality of external teeth;

a wear portion of said gear member which is made of a resiliently deformable, generally noncompressible material and loosely encircles said base portion as an internal array of interior teeth of said wear portion partially mate with said plurality of teeth of said base portion;

said internal array including a number of said interior teeth which is greater than said plurality of external teeth of said base portion;

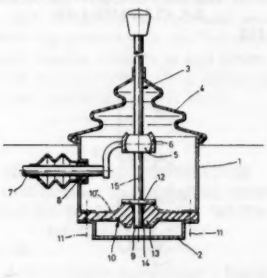
said wear portion including about its outer surface mating teeth for engagement with said second gear member.

4,077,275

GEARSHIFT LEVER ASSEMBLY

Erwin Kluge, Wolfsburg, and Burckhardt Becker, Solingen-Widdert, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Jun. 18, 1976, Ser. No. 697,691
Claims priority, application Germany, Jul. 10, 1975, 2530802
Int. Cl.² G05G *9/12*
U.S. Cl. 74—473 R **4 Claims**



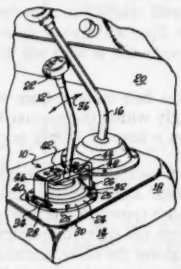
1. A gearshift lever assembly comprising a housing, a gearshift lever having an axis and arranged partially within said housing, and a support interconnecting said lever and said housing and providing support for said lever in directions transverse to said axis, said support comprising a member made from rubberlike material surrounding said lever and assembled with permanent pretensioning in a direction opposite to the movement of said lever into one of its shift positions, and providing elastic restoring forces in opposition to such movement.

4,077,276

ACTUATOR LEVER LOCK FOR A FOUR WHEEL DRIVE VEHICLE TRANSFER CASE

William G. Knox, Jr., 2079 N. Redding Ave., San Gabriel, Calif. 91770

Filed Oct. 21, 1976, Ser. No. 734,545
Int. Cl.² G05G *9/00*
U.S. Cl. 74—475 **10 Claims**



1. An actuator lever lock for the transfer case of a four wheel drive vehicle including:

a base member fixedly mounted relative to the transfer case and positioned about the actuator lever thereof;

a pair of pivot members connected to said base member in parallel alignment with the direction of shifting motion of the actuator lever; and

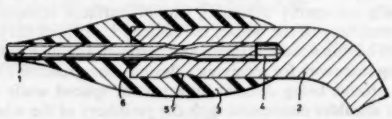
an inverted U-shaped strap member connected for rotation at its ends to said pivot members, said strap member having at least one cutout partially through a side portion thereof in position to engage the lever when it is in a predetermined position to prevent shifting lever movement and a connected lockable closure member adjacent said cutout which in association with said cutout can surround the lever.

4,077,277

CABLE ASSEMBLY

Bodo Henning, Braunschweig, Germany, assignor to Volkswagenwerk Aktiengesellschaft, Germany

Filed Jul. 29, 1976, Ser. No. 709,788
Claims priority, application Germany, Aug. 29, 1975, 2538429
Int. Cl.² F16C *1/10*
U.S. Cl. 74—501 P **1 Claim**

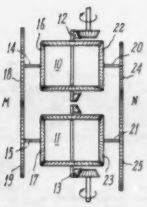


1. A force transmitting cable assembly comprising a flexible cable, an endpiece attached to one end of the cable for interconnecting the cable with associated mechanisms, and a plastic sheathing adhering to and partially overlapping the cable and the endpiece, said sheathing having a diameter which decreases from the endpiece in the direction of the cable.

4,077,278
TORQUE CONVERTER

Michel Combastet, 43, rue de Villiers, Neuilly-sur-Seine, France (F 92200)

Filed Aug. 17, 1976, Ser. No. 715,194
Claims priority, application France, Oct. 10, 1975, 75 31066
Int. Cl.[2] F16H *37/06, 1/38*
U.S. Cl. 74—682 6 Claims



1. A mechanical torque converter operating by differential retroaction, said torque converter comprising:

a power input shaft;

a power receiving output shaft;

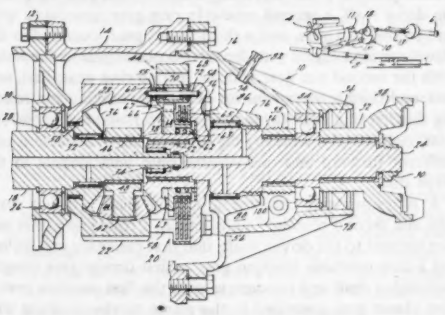
first and second differentials, the cage of the first differential being coupled to and receiving the power from said power input shaft, and the cage of the second differential being coupled to and driving said power receiving output shaft; and

said first and second differentials each having planet wheels coupled by pairs such that a first group forms a gear train providing a gear ratio M and a second group forms a gear train providing a gear ratio N, wherein the ratio M/N is other than unity.

4,077,279
DIFFERENTIAL GEAR MECHANISM

Edward J. Goscenski, Jr., Battle Creek, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 572,234, April 28, 1975, abandoned.
This application Nov. 8, 1976, Ser. No. 739,757
Int. Cl.[2] F16H *1/44*
U.S. Cl. 74—711 9 Claims

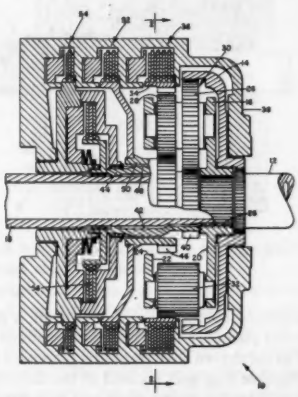


1. An inter-axle differential gear mechanism of the side gear type for transmitting power to front and rear axles used to drive a vehicle, said mechanism comprising two annular side gears mounted for rotation about a common axis, each side gear having an annular array of teeth, an axially extending output shaft rotatably mounted and coaxial with one of said side gears and adapted to rotate one of said axles, one or more pinion gears having teeth engaging the teeth of said side gears an annular toothed output member to rotate the other axle and carried for rotation with and encircling the other side gear and extending axially therefrom toward the one side gear, a portion of said teeth on said annular output member being disposed in a plane intermediate said teeth of said side gears, and means supporting each pinion gear for rotation relative to said toothed output member about said axis of said side gears and for rotation about a second axis not coaxial with said axis of said side gears, said supporting means including an axially extending input shaft coaxial with said side gears and passing axially internally of the other side gear, and a spider secured for rotation to said input shaft intermediate said side gears and including a radially extending pinion shaft for each pinion gear, each pinion gear being mounted for rotation upon one of said pinion shafts.

4,077,280
TRANSMISSION

James Henry Kress, Cedar Falls, and Richard Arlo Michael, Waterloo, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Dec. 21, 1976, Ser. No. 752,744
Int. Cl.[2] F16H *57/10*
U.S. Cl. 74—760 11 Claims



1. A transmission comprising: a drive shaft, a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable ring gear secured to the drive shaft; a first sun gear encircling the driven shaft and concentric with the first ring gear, a first planet gear journaled in the planet carrier meshing with the first ring gear and the first sun gear, and a second planet gear integral with the first planet gear and coaxial therewith; said second planetary unit including a second sun gear encircling the driven shaft and axially spaced from the first sun gear, a second rotatable ring gear concentric with said second sun gear, and a third planet gear journaled in the planet carrier meshing wi.h the first planet gear and the second ring gear; first, second, and third brake means for selectively braking and releasing the second ring gear, the second sun gear and the first sun gear, respectively, whereby the driven shaft is rotatable at three different forward ratios with respect to the drive shaft.

6. A transmission comprising: a drive shaft; a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable reaction gear secured to the drive shaft; a first driven gear encircling the driven shaft and concentric with the first reaction gear, a first planet gear journaled in the planet carrier meshing with the first reaction gear and the first driven gear, and a second planet gear integral with the first planet gear and coaxial therewith; said second planetary unit including a second driven gear encircling the driven shaft and axially spaced from the first driven gear, a second rotatable reaction gear concentric with said second driven gear, and a third planet gear journaled in the planet carrier meshing with the first planet gear and the second reaction gear; first, second

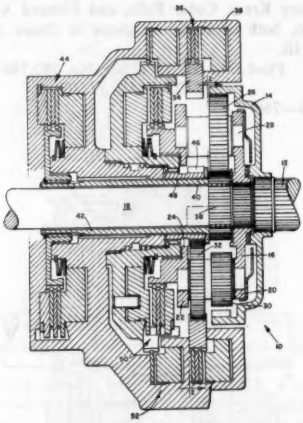
and third brake means for selectively braking and releasing the second reaction gear, the second driven gear and the first driven gear, respectively, whereby the driven shaft is rotatable at three different forward ratios with respect to the drive shaft.

4,077,281

TRANSMISSION

Richard Arlo Michael, Waterloo, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Dec. 21, 1976, Ser. No. 752,746
Int. Cl.² F16H *57/10*
U.S. Cl. 74—760 **11 Claims**



1. A transmission comprising: A drive shaft; a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable ring gear secured to the drive shaft, a first sun gear encircling the driven shaft and concentric with the first ring gear, and a first planet gear journaled in the planet carrier meshing with the first ring gear and the first sun gear; said second planetary unit including a second sun gear encirling the driven shaft and axially spaced from the first sun gear, a second rotatable ring gear concentric with said second sun gear, a second planet gear journaled in the planet carrier meshing with the first planet gear, and a third planet gear integral with the second planet gear and coaxial therewith meshing with the second ring gear and the second sun gear; first, second, and third brake means for selectively braking and releasing the second ring gear, the first sun gear and the second sun gear, respectively, whereby the driven shaft is rotatable at three different forward ratios with respect to the drive shaft.

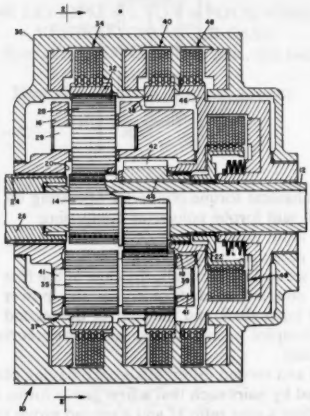
6. A transmission comprising: A drive shaft; a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable reaction gear secured to the drive shaft, a first driven gear encircling the driven shaft and concentric with the first reaction gear, and a first planet gear journaled in the planet carrier meshing with the first reaction gear and the first driven gear; said second planetary unit including a second driven gear encircling the driven shaft and axially spaced from the first driven gear, a second rotatable reaction gear concentric with said second driven gear, a second planet gear journaled in the planet carrier meshing with the first planet gear, and a third planet gear integral with the second planet gear and coaxial therewith meshing with the second reaction gear and the second driven gear; first, second, and third brake means for selectively braking and releasing the second reaction gear, the first driven gear and the second driven gear, respectively, whereby the driven shaft is rotatable at three different forward ratios with respect to the drive shaft.

4,077,282

TRANSMISSION

James Henry Kress, Cedar Falls, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Dec. 23, 1976, Ser. No. 753,644
Int. Cl.² F16H *57/10*
U.S. Cl. 74—760 **9 Claims**



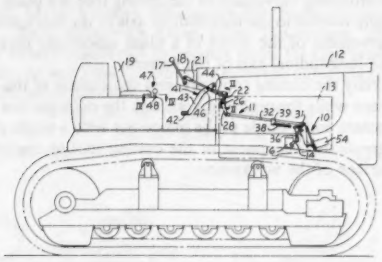
1. A transmission comprising: a drive shaft; a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable ring gear, a first sun gear integral with the drive shaft and concentric with the first ring gear, a first planet gear journaled in the planet carrier meshing with the first sun gear and the first ring gear, and a second planet gear journaled in the planet carrier and meshing with the first planet gear; said second planetary unit including a second sun gear encircling the drive shaft, a second rotatable ring gear concentric with said second sun gear, and a third planet gear journaled in the planet carrier integral with the second planet gear and meshing with the second sun gear and the second ring gear; first, second, and third brake means for selectively braking and releasing the first ring gear, the second ring gear, and the second sun gear, respectively, whereby the driven shaft is rotatable at two different forward and one reverse ratio with respect to the drive shaft.

5. A transmission comprising: a drive shaft; a driven shaft; first and second planetary units having a rotatable planet carrier secured to the driven shaft; said first planetary unit including a first rotatable reaction gear, a first driven gear integral with drive shaft and concentric with the first reaction gear, a first planet gear journaled in the planet carrier meshing with the first driven gear and the first reaction gear, and a second planet gear journaled in the planet carrier and meshing with the first planet gear; said second planetary unit including a second driven gear encircling the drive shaft, a second rotatable reaction gear concentric with said second driven gear, and a third planet gear journaled in the planet carrier integral with the second planet gear and meshing with the second driven gear and the second reaction gear; first, second, and third brake means for selectively braking and releasing the first reaction gear, the second reaction gear, and the second driven gear respectively, whereby the driven shaft is rotatable at two different forward and one reverse ratio with respect to the drive shaft.

4,077,283
ENGINE SPEED REDUCER RESPONSIVE TO POSITIONING OF THE TRANSMISSION SHIFT LEVER

James T. Hammond, Tremont, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 22, 1975, Ser. No. 643,415
Int. Cl.[2] B60K *41/04*; G05G *9/10, 13/00*
U.S. Cl. 74—860 3 Claims



1. In a track-type vehicle of the type having an engine, a control linkage for selectively setting the engine speed between a low idle speed and a predetermined high speed, a transmission shift lever for selectively determining the vehicle speed range and its direction of travel and shiftable between at least one forward and one reverse speed setting, the improvement comprising:

an actuating lever operatively associated with the control linkage and having a first noninterferring position relative to the control linkage and rotatable to a second position for engaging and moving the control linkage in a direction for reducing the engine speed to an intermediate speed slower than the predetermined high speed;

a solenoid having a plunger connected to the lever;

a source of electrical power;

means for connecting the source of electrical power to the solenoid including a normally nonconductive switch which normally maintains the solenoid in a de-energized condition, said switch positioned to be closed in response to shifting the transmission shift lever to the one reverse speed setting whereby closing of the switch energizes the solenoid to move the lever to its second position;

a magnet attached to the transmission shift lever and wherein the switch is an electrical switching device of the type which is rendered conductive by the influence of the magnet;

said control linkage including a lever rotatable between a first position in which the engine speed is at the low idle speed and a second position in which the engine speed is at the predetermined high idle speed, said lever being positioned to be engaged by said actuating lever to rotate the lever to a third position to establish the intermediate speed of the engine when the solenoid is energized; and

wherein the control linkage includes a hand control lever manually positionable for rotating the lever between its first and second positions, and a one-way clutch to permit the lever to be rotated to the third position without affecting the position of the hand control lever.

4,077,284
STONE SETTING PRESS

Paul M. Twichell, Brewster, Mass., assignor to Guertin Brothers, Inc., Hyannis, Mass.

Filed Oct. 29, 1975, Ser. No. 626,738
Int. Cl.[2] B23P *5/00*
U.S. Cl. 81—7 8 Claims

1. A stone setting press for securing a stone to a stone setting comprising:

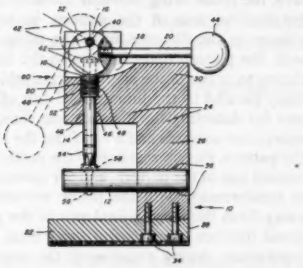
a common frame,

a shaft having a head at one end and a die at the other end shaped to engage and deform the prongs of a setting about a stone when said die is moved to a prong deforming position, said shaft being longitudinally rigid from its head to its die,

means journaling said shaft in said frame for axial movement to and from said deforming position,

a leverage system supported on said frame and positioned to engage the head of said shaft to apply axial forces to said shaft for movement thereof to bring said die to said deforming position,

said leverage system including a cam rotatably supported by said frame for rotation about an axis normal to the longitudinal axis of said shaft and further including means to rotate said cam, said cam having a cam surface defined in part by a maximum radial projection having a length such that rotation of the cam moves said shaft to said deforming



position when said cam surface engages said head at said maximum radial projection;

said leverage system being constructed and arranged to urge the shaft toward said deforming position under a progressively increasing mechanical advantage and under a progressively increasing force as said die approaches said deforming position, said force reaching its maximum just as said die approaches said deforming position,

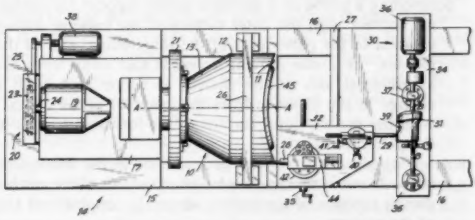
a setting support for retaining a stone setting at said deforming position, and

said setting support comprising, an arbor extending along an axis normal to the axis of said shaft with a portion of its surface located along the axis line defined by said shaft, and at a distance from said shaft beyond said deforming position, and means securing said arbor to said common frame.

4,077,285
METHOD OF AND APPARATUS FOR MACHINING A CONTOURED SURFACE

Paul Duliba, Warren, Pa., assignor to National Forge Company, Irvine, Pa.

Filed Mar. 8, 1976, Ser. No. 664,672
Int. Cl.[2] B23B *1/00, 3/28*
U.S. Cl. 82—1 C 23 Claims



1. An apparatus for contouring a surface of workpiece, comprising:

means for rotating the workpiece and the surface of the

workpiece about a longitudinal axis of the workpiece, which extends through the surface of the workpiece;

a pattern; means for rotating the pattern about a longitudinal axis of the pattern;

means for synchronizing the rotation of the workpiece about the longitudinal axis of the workpiece and the rotation of the pattern about the longitudinal axis of the pattern;

a cutting tool positioned on a movable tool support; during rotation of the workpiece about the longitudinal axis of the workpiece, the cutting tool being movable towards and away from the surface of the workpiece for cutting the surface of the workpiece; the cutting tool also being movable in a plane essentially normal to the longitudinal axis of the workpiece;

a probe positioned on a movable probe support for continual contact with the outer surface of the pattern; during rotation of the pattern about the longitudinal axis of the pattern, the probe being movable towards and away from the longitudinal axis of the pattern, in accordance with a change in the distance from the point of probe contact with the pattern outer surface to the longitudinal axis of the pattern; the probe also being movable in a plane essentially parallel to the longitudinal axis of the pattern;

means for detecting the distance and direction of the probe movement towards and away from the longitudinal axis of the pattern, during rotation of the pattern about the longitudinal axis of the pattern, and for moving the cutting tool, in synchronism with the probe movement towards and away from the longitudinal axis of the pattern, a proportional distance towards and away from the surface of the workpiece, during rotation of the workpiece about the longitudinal axis of the workpiece, whereby the cutting tool cuts the surface of the workpiece;

means for moving the cutting tool in a plane essentially normal to the longitudinal axis of the workpiece;

means for moving the probe in a plane essentially parallel to the longitudinal axis of the pattern; and

means for synchronizing movement of the cutting tool in a plane essentially normal to the longitudinal axis of the workpiece and movement of the probe in a plane essentially parallel to the longitudinal axis of the pattern;

whereby the cutting tool traverses the surface of the workpiece while the probe moves along the outer surface of the pattern and a single probe in contact with a single pattern directs the movement of the cutting tool to contour the surface of the workpiece.

16. A method of contouring a surface of a workpiece, comprising:

rotating the workpiece and the surface of the workpiece about a longitudinal axis of the workpiece, which extends through the surface of the workpiece;

rotating a pattern about a longitudinal axis of the pattern;

synchronizing rotation of the workpiece about the longitudinal axis of the workpiece and rotation of the pattern about the longitudinal axis of the pattern;

positioning a cutting tool on a movable tool support; during rotation of the workpiece about the longitudinal axis of the workpiece, the cutting tool moving towards and away from the surface of the workpiece for cutting the surface of the workpiece;

positioning a probe on a movable probe support for continual contact with the outer surface of the pattern; during rotation of the pattern about the longitudinal axis of the pattern, the probe moving towards and away from the longitudinal axis of the pattern in accordance with a change in the distance from the point of probe contact with the pattern outer surface to the longitudinal axis of the pattern;

detecting the distance and direction of probe movement towards and away from the longitudinal axis of the pattern during rotation of the pattern about the longitudinal axis of the pattern;

moving the cutting tool, in synchronism with the probe movement towards and away from the longitudinal axis of the pattern, a proportional distance towards and away from the surface of the workpiece, during rotation of the workpiece about the longitudinal axis of the workpiece, whereby the cutting tool cuts the surface of the workpiece;

moving the cutting tool in a plane essentially normal to the longitudinal axis of the workpiece;

moving the probe in a plane essentially parallel to the longitudinal axis of the pattern; and

synchronizing movement of the cutting tool in a plane essentially normal to the longitudinal axis of the workpiece and movement of the probe in a plane essentially parallel to the longitudinal axis of the pattern;

whereby the cutting tool traverses the surface of the workpiece while the probe moves along the outer surface of the pattern and a single probe in contact with a single pattern directs the movement of the cutting tool to contour the surface of the workpiece.

4,077,286

VERTICAL BORING AND TURNING MILL

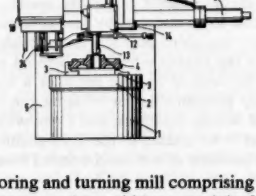
Heinz vom Dorp, and Hermann Wolters, both of Moenchengladbach, Germany, assignors to Firma W. Hegenscheidt Gesellschaft mbH, Erkelenz, Monchen Gladbach, Germany

Filed Mar. 17, 1977, Ser. No. 778,611

Claims priority, application Germany, Apr. 1, 1976, 2614003

Int. Cl.[2] B23B *3/00*

U.S. Cl. 82—2 D **8 Claims**

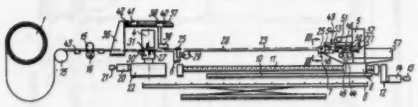


1. A vertical boring and turning mill comprising a base, table means rotatably supported on said base, upright frame means, horizontal cross beam means supported by said upright frame means, support means on said cross beam, a plurality of horizontal slide means supported for horizontal adjustment along said cross beam, a further plurality of tool supporting vertical slide means carried on said horizontal slide means for vertical adjustment along said horizontal slide means, positive drive means operatively connected to at least one of said slide means for positively driving said one slide means, and coupling means arranged for operatively interconnecting at least one other slide means to said drive means connected, positively driven slide means.

4,077,287
APPARATUS FOR CROSS CUTTING COILED STRIP INTO RECTANGULAR AND OBLIQUE ANGLED PLATES AND CUTTING OFF ACUTE ANGLES

Boris Anatolievich Makeev, ulitsa Novgorodskaya, 6, kv. 29; Lev Mikhailovich Stepochkin, ulitsa Chernoglazovskaya, 11A, kv. 9; Vadim Ivanovich Batozsky, Moskovsky prospekt, 28, kv. 21; Alexandr Iosifovich Khodorov, Sadovy proezd, 1, kv. 89; Jury Petrovich Burchenko, Moskovsky prospekt, 40/42, kv. 14; Vladimir Nikolaevich Sila, Streletsky pereulok, 14A; Garri Moiseevich Korot, ulitsa Timurovtsev, 25A, kv. 100; Adolf Grigorievich Eremenko, ulitsa III Internatsionala, 17, kv. 24, and Vitaly Ivanovich Zhuravlev, ulitsa Slinko, 14A, kv. 50, all of Kharkov, U.S.S.R.

Filed Oct. 18, 1976, Ser. No. 733,372
Int. Cl.[2] B26D *5/02*
U.S. Cl. 83—92 12 Claims



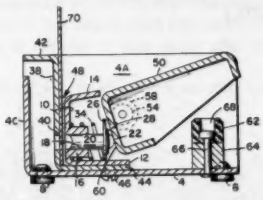
1. An automatic line for cross cutting a coiled strip into rectangular and oblique-angled plates and for cutting off sharp angles, comprising, in successive arrangement: decoiling means; a drive means for linearly moving the strip being decoiled; pivoted guillotine shears for cutting plates off the strip at an adjustable angle in the strip's plane; non-pivoted guillotine shears for cutting off sharp angles at a constant angle to the direction in which the strip is being fed; means for the removal of cut-off plates from the zone between said shears; means to receive and stack the cut-off plates; means for adjustable displacement of said non-pivoted shears in the zone downstream of said pivoted shears in the direction of the strip feed in order to ensure a prescribed distance between said shears and to cut off sharp angles simultaneously with cutting off plates; said means for moving said strip being provided with a pair of driven rollers which are set into rotation by a first step electrohydraulic drive by means of a reduction gear; pulse means to control said first step electrohydraulic drive to accelerate, feed, and brake said strip, as well as to reverse its motion, all with the aid of the same driven rollers, in order to ensure a prescribed plate length; a second step electrohydraulic drive for said pivoted shears, said second step electrohydraulic drive controlling the angle at which said pivoted shears are arranged with respect to the strip's plane; means to synchronize the operation of both said step electrohydraulic drives connected to said drives for turning said pivoted shears through a prescribed angle simultaneously with feeding the strip by the driven rollers, whereby a plate is cut off the strip and is at the same time chamfered at a prescribed angle.

4,077,288
VERTICAL ENTRY MULTIPLE PAPER PUNCH

Donald L. Holland, Statesville, N.C., assignor to Hunt Manufacturing Co., Philadelphia, Pa.

Filed Jan. 7, 1977, Ser. No. 757,519
Int. Cl.[2] B26F *1/02*
U.S. Cl. 83—146 4 Claims

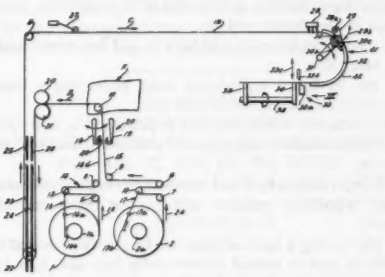
1. A multiple paper punch comprising:
a substantially horizontal base,
a substantially vertical stripper plate mounted on the base and having a plurality of substantially horizontal openings for punch pins,
a substantially horizontal punch pin mounted in each opening, each punch pin having a cam follower head,
a substantially vertical die plate mounted on the base behind the stripper plate with openings in line with the openings in the stripper plate,
said stripper plate and said die plate forming a guide for the vertical entry of a sheet of paper to be punched,
a downwardly actuated operating bar mounted on a substantially horizontal pivot which is in front of the stripper plate and having an integral depending cam portion adapted to engage said follower head of each punch pin, and
spring means to bias the punch pins and operating bar to an inactive position.



4,077,289
APPARATUS FOR CONVERTING A RIBBON OF LABELS INTO DISCRETE LABELS

Willy Rudszinat, Dassendorf, Germany, assignor to Hauni Werke Korber & Co., KG, Hamburg, Germany

Filed Nov. 18, 1976, Ser. No. 742,888
Int. Cl.[2] B65H *17/40*
U.S. Cl. 83—152 10 Claims



1. Apparatus for converting a ribbon consisting of a series of coherent labels into discrete labels, comprising a source of ribbon; means for moving the ribbon from said source lengthwise in a predetermined direction; guide means defining for the ribbon an elongated path including at least one arcuate portion; and means for severing the ribbon at regular intervals downstream of said arcuate portion, as considered in said direction, so that the ribbon yields a succession of discrete labels, said moving means including a first pivotable ribbon deforming member at one side of said arcuate portion of said path, a second ribbon deforming member located opposite said first deforming member at the other side of said arcuate portion, means for intermittently moving said second deforming member toward said first deforming member to thereby deform the ribbon portion between said members, and means for pivoting said first deforming member along said arcuate portion in and counter to said direction, said first deforming member having means for pushing the deformed portion of the ribbon toward said severing means during movement of said first deforming member in said direction.

4,077,290

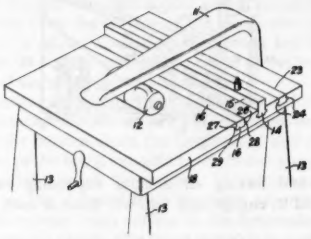
RADIAL ARM SAW TABLE TOP

Emanuel N. Hreha, 348 E. 27th St., Erie, Pa. 16504

Continuation-in-part of Ser. No. 515,351, Nov. 7, 1974, abandoned. This application Aug. 26, 1976, Ser. No. 718,054

Int. Cl.[2] B23D *47/04*

U.S. Cl. 83—471.2 **1 Claim**



1. In combination, a table saw having a table and a fence comprising,

a flat topped table having a first end and a second end,

a saw supported over said table to move longitudinally thereof,

a rectangular, laterally-extending groove in said table, extending from said first end thereof to the said second end,

said groove having a bottom and two side walls and a longitudinally-extending slot in each of the side walls spaced from said bottom defining said groove,

a fence,

said fence being generally rectangular in cross section and having a width substantially equal to the width of said slot,

a vertically-extending hole is said fence,

a vertically-extending hole is said table registering with said hole in said fence, and

a pin extending through said hole in said fence into said hole in said table,

said pin having a cylindrical head providing a limit for downward movement of said pin,

a said vertically-extending hole is provided in said cylindrical head identical in shape and position to said hole in said fence,

said hole in said cylindrical member having a counterbore in said cylindrical member adjacent the upper end of said hole,

said pin having a head adapted to be received in said counterbore and to extend downwardly into said hole in said table with the head of said pin being received in said counterbore flush with the top of said fence whereby said head will not interfere with work sliding over the top of said table.

4,077,291

WEB SLITTING APPARATUS

David Noel Obenshain, Swanton, Md., assignor to Westvaco Corporation, New York, N.Y.

Filed Mar. 15, 1977, Ser. No. 777,780

Int. Cl.[2] B23D *19/06*

U.S. Cl. 83—499 **1 Claim**

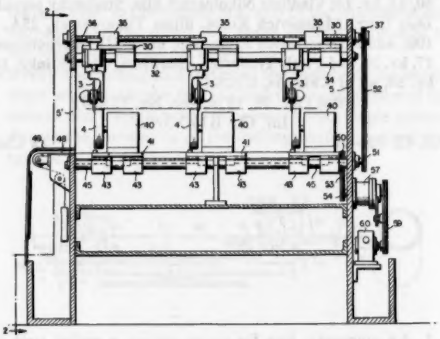
1. Web slitting apparatus comprising guide shafts located above and below a traveling web and fixed between a pair of machine frame elements for suspending a plurality of slitter unit support plates in upper and lower pairs for lateral movement across the width of said web, a slitter unit element fixedly attached to each support plate, a positioning means for each slitter unit support plate mounted between said machine frame elements adjacent to said guide shafts, and means attached to each of said slitter unit support plates for cooperating with said positioning means, the improvement comprising:

(a) a separate connecting means between the positioning means for each pair of slitter unit support plates;

(b) a separate clutch/brake unit for each pair of slitter unit support plates mounted on said machine frame;

(c) individual connecting means between the separate clutch/brake units and paired slitter unit support plates;

(d) a single driving means adapted to drive said slitter units through said clutch/brake units;



(e) a common connecting means between said single driving means and each of said clutch/brake units; and,

(f) a control means for selectively disengaging the brake and engaging the clutch of one or more of said clutch/brake units for individually or simultaneously driving one or more of said slitter unit positioning means to position said slitter units laterally of said web.

4,077,292

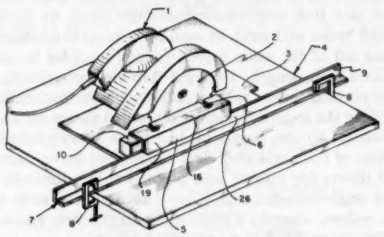
GUIDING ASSEMBLY FOR A PORTABLE POWER TOOL

Eugene E. Cole, R.D. No. 3, Box 485, Apollo, Pa. 15613

Filed Mar. 26, 1976, Ser. No. 670,656

Int. Cl.[2] B27B *9/04*

U.S. Cl. 83—745 **18 Claims**



1. In combination with a portable power tool adapted to cut a straight line along a workpiece and having a sole plate for contacting the workpiece while the cut is being made, the improvement in an attachment for guiding the tool along the workpiece in the line of the cut to be made comprising:

A. means releasably secured to the sole plate and extending parallel to the line of the cut to be made but spaced laterally therefrom for supporting a guiding means;

B. guiding means adjustably secured to the supporting means and comprising an L-shaped member including a first leg extending laterally away from the line of the cut to one made and a second leg depending from said first leg, said second leg extending substantially parallel to the supporting means and to the line of the cut to be made, said second leg and said supporting means being adjustably spaced from one another a sufficient distance to provide a space therebetween for receiving a longitudinal member releasably attached to the workpiece and ori-

ented in the direction of the cut to be made, whereby the portable power tool can be used to cut a straight line using any convenient longitudinal member and not one especially designed to cooperate with the guiding means.

4,077,293

SAMPLE HOLD ARRANGEMENT FOR A KEY SIGNAL IN AN ELECTRONIC MUSICAL INSTRUMENT

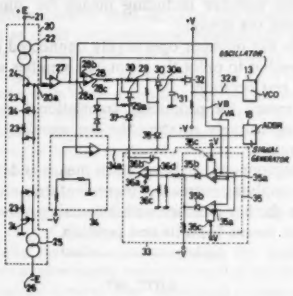
Shigeru Uchiyama, Omiya, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sep. 27, 1976, Ser. No. 727,238

Claims priority, application Japan, Sep. 29, 1975, 50-116339; Jun. 30, 1976, 51-76585

Int. Cl.² G10H *1/00, 5/02*

U.S. Cl. 84—1.01 **3 Claims**



1. A sample hold arrangement for a key signal in an electronic musical instrument comprising: depressable keys; a keyboard circuit for generating a voltage corresponding to a depressed key; a comparator with a first input terminal connected to an output terminal of said keyboard circuit; a memory capacitor; a buffer circuit; and two gates; an output terminal of said comparator being connected to said memory capacitor and said buffer circuit through said two gates; said gates being connected in series; said buffer circuit having an output terminal connected to a second input terminal of said comparator; a detection circuit; one of said two gates being connected at a control electrode thereof to said detection circuit; a keying signal generator connected to the output of said keyboard circuit for generating a keying signal of said keyboard circuit, said detection circuit generating a circuit closing signal when potentials of said two input terminals of said comparator become substantially equal; the other one of said two gates being connected at a control electrode thereof to an output terminal of said keying signal generator.

4,077,294

ELECTRONIC MUSICAL INSTRUMENT HAVING TRANSIENT MUSICAL EFFECTS

Teruo Hiyoshi; Akira Nakada; Shigeru Yamada, all of Hamamatsu; Kiyoshi Ichikawa, Hamakita, and Sigeki Isii, Hamamatsu, all of Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Hamamatsu, Japan

Filed Oct. 7, 1976, Ser. No. 730,426

Claims priority, application Japan, Oct. 7, 1975, 50-121055

Int. Cl.² G10H *1/06, 5/02*

U.S. Cl. 84—1.23 **3 Claims**

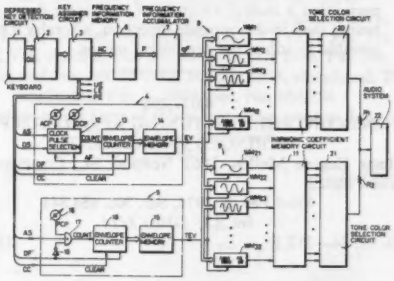
1. An electronic musical instrument comprising:

address signal generating means which generates an address signal that corresponds to a frequency of a tone to be produced;

a plurality of waveshape memory systems, each system including memories storing respective harmonic waveshapes, said memories all being connected to said address signal generating means so as to be read out in parallel by said address signal;

a first circuit for producing a first envelope signal which rises upon depression of a key, sustains at a certain level while the key is being depressed and decays upon release of the key, and controlling the amplitude of the respective harmonic waveshapes read from one of said plurality of waveshape memory systems by said first envelope signal, said first envelope signal thereby establishing a tone production period that begins upon depression of said key and terminates at the end of said decay after release of said key;

a second circuit for producing a second envelope signal



which rises and thereafter falls during a fractional portion of time of said tone production period, and controlling the amplitude of the respective harmonic waveshapes read from the rest of said plurality of waveshape memory systems by said second envelope signal; and

a selection and mixing circuit for selectively mixing the harmonic waveshapes read from the respective waveshape memory systems;

thereby producing a musical tone wherein tone color and volume changes during said fractional portion of time relative to the rest of the tone production period.

4,077,295

FINE TUNING PEG

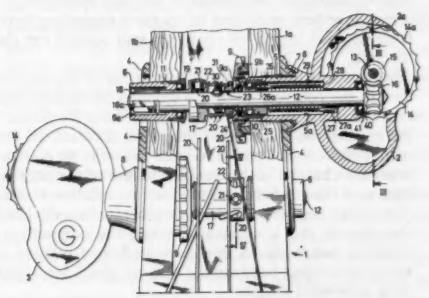
Walter Zapp, Ebenau 877, Oberegg, Switzerland (9413)

Filed Aug. 25, 1976, Ser. No. 717,513

Claims priority, application Switzerland, Aug. 29, 1975, 11375/75

Int. Cl.² G10D *3/14*

U.S. Cl. 84—304 **12 Claims**



1. A fine-tuning peg which is suitable for use on a stringed instrument and comprises fixing means adapted for holding the peg firmly in a peg box of the stringed instrument, against being loosened by the pull of the string, a peg head which is partly hollow and adapted for being firmly fixed at the peg box of the stringed instrument, a tuning wheel in the interior of the

peg head, said peg head having a neck part, a rotatable tuning shaft being supported in said neck part and being connected to said tuning wheel for turning the latter, pre-tuning means associated with the free end of said tuning shaft, a string drum seated on said tuning shaft, means for securing said string drum, during fine-tuning, against a shift in axial direction on said tuning shaft; a device for compensating the pull of the string being connected to said tuning shaft, by means of which device a pull, exerted on the tuning shaft by the string via the string drum, is largely or completely compensated; and

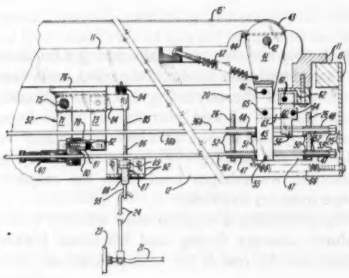
a disengageable locking mechanism adapted for securing the string drum against turning, relative to the tuning shaft, in the sense of the direction of the pull of the string, but permitting a mutual twisting of the string drum and the tuning shaft in the opposite direction, whereby it becomes possible to adjust the pre-tuning means.

4,077,296

TONE CONTROL AND TUNING APPARATUS FOR A STRINGED INSTRUMENT

Delmar Eugene Mullen, 7061 Newport St., Commerce City, Colo. 80022

Filed Feb. 3, 1976, Ser. No. 654,841
Int. Cl.[2] G10D *3/14*
U.S. Cl. 84—312 P **32 Claims**



1. A tuner for finely adjusting the maximum amount of longitudinal movement imparted to a rotatable control rod by a translational movement apparatus in a stringed instrument of the type having a tone changer for selectively varying the tension in one or more strings, comprising;

a first stop member having a threaded portion;

a second stop member having a threaded portion for engaging the threaded portion of the first stop member whereby the engaged length of the stop members may be varied by relative rotational movement of the stop members;

said stop members providing an aperture extending through their engaged length for receiving said control rod therethrough;

means for operatively rigidly attaching one of the stop members to the control rod of the stringed instrument; and

means extending from the other stop member for contacting the control rod and for resisting relative rotational movement between the control rod and the other stop member, whereby changes in the engaged length of the stop members as a result of naturally-occurring relative rotational movement between the stop members when attached to the control rod is eliminated while the contacting and resisting means allows intentionally forced relative rotational movement between the stop members for adjusting their combined length.

22. A translational movement apparatus for supplying movement in a desired longitudinal direction to at least one control rod connected to a tone changer in a stringed instrument, comprising:

at least one rocking arm, each rocking arm including means for pivotably connecting one end of the rocking arm to the instrument;

a supporting member includng means for delivering movement from the supporting member to at least one control rod and means for pivotably connecting the supporting member to the other end of each rocking arm;

means operatively connected to at least one rocking arm for pivoting each rocking arm and causing the supporting member to move in the desired longitudinal direction; and,

maintaining means for maintaining the supporting member and the delivering means in the same rotational orientation when the supporting member moves in the desired longitudinal direction, said maintaining means operatively connecting the supporting member to the instrument independently of the control rod.

30. A tone changer device for attachment to one end of a string of a stringed instrument for selectively varying the tension of the string, comprising:

a pivotable member including means for supporting and anchoring the string;

a rotatable bar member operatively connected to the pivotable member to pivot the pivotable member when rotated from a rest position;

actuator means for producing translational movement for use in operatively rotating the bar member from its rest position; and

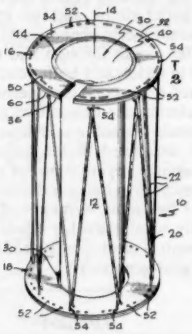
means interconnecting the actuator means and the bar member for applying increasing incremental amounts of movement to the bar member with increasing movement of the actuator means from its rest position.

4,077,297

VARIABLE PITCH DRUM

Craig Woodson, 2314 Frey Ave., Venice, Calif. 90291

Filed Feb. 3, 1976, Ser. No. 654,761
Int. Cl.[2] G10D *13/02*
U.S. Cl. 84—411 R **12 Claims**



1. A variable pitch drum head comprising:

a first, substantially rigid ring having a generally planar outer surface, a generally planar inner surface parallel to and spaced apart from the outer surface, an inner circumference and an outer circumference;

a membrane extending across the area defined within the inner circumference and at least part way from the inner circumference toward the outer circumference adjacent the inner surface of the first ring;

a second, substantially rigid ring having a generally planar outer surface, a generally planar inner surface parallel to and spaced apart from the outer surface of the second ring, an outer circumference which approximately conforms in shape and size to the outer circumference of the first ring, and an inner circumference that is slightly smaller than the inner circumference of the first ring, said inner circumference being slightly larger than the circumference of the drum shell intended to be used with the said

drum head, the outer surface of the second ring being disposed adjacent the inner surface of the first ring with a portion of the membrane sandwiched therebetween;

means for securing the membrane in fixed relation between the first and second rings; and

a plurality of hooks extending from the inner surface of the second ring adjacent the outer circumference, the hooks being suitable for receiving and supporting a head tensioning cord.

7. A variable pitch drum comprising:

a hollow cylindrical shell extending along a central longitudinal axis between first and second opposite ends which extend generally perpendicular to the axis;

a pair of membranes extending across the opposite ends of the shell, the membranes extending beyond an outer circumference of the shell;

a pair of rigid, circular ring assemblies disposed adjacent the opposite ends of the shell, each having an inner circumference slightly greater than an outer circumference of the shell and an outer circumference substantially greater than the inner circumference, each ring assembly including a pair of rings secured in fixed relation to each other with a portion of a membrane extending beyond an outer circumference of the shell secured therebetween to permit tension to be developed across the membranes when the ring assemblies are forced toward one another, the ring assemblies each further including a plurality of hooks secured thereto, the hooks being spaced about the ring assemblies near the outer circumference and extending toward the opposite end of the shell; and

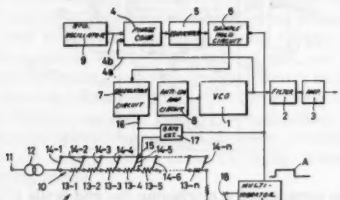
a substantially inelastic cord threading the hooks on ring assemblies at alternately opposite ends of the drum shell to permit manual control over substantial changes in pitch of the drum tone by selectively manually squeezing the cord toward the drum shell, said substantial changes in pitch being permitted by a sufficient radial distance being provided between the inner and outer circumferences of said ring assemblies.

4,077,298

APPARATUS FOR AUTOMATICALLY TUNING AN ELECTRONIC MUSICAL INSTRUMENT

Nobuaki Kondo, Minamisaitama, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Oct. 22, 1976, Ser. No. 735,212
Int. Cl.² G10G 7/02
U.S. Cl. 84—454 **10 Claims**



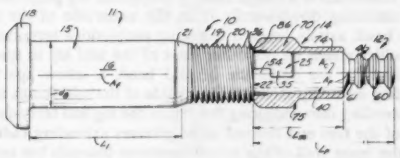
1. An apparatus for the automatic tuning of an electronic musical instrument comprising a phase comparator having two inputs, converter means connected to said comparator for producing a signal corresponding to the output of the comparator, calculator means having first and second inputs, said first input of said calculator means being connected to said converter means, voltage controlled oscillator means for generating a musical tone signal having an output connected to one of said inputs of said phase comparator, means connected to the other input of the phase comparator for applying a standard signal thereto, key signal generating means including a plurality of keys for generating a voltage corresponding to an actuated key, said key signal generating means having an output connected to said second input of said calculator means, said key signal generating means including a gate means for passing a key signal corresponding to a specific key, and multi-vibrator means including control switch means coupled to said gate means and said converter means.

4,077,299

FASTENER WITH REMOVABLE PINTAIL AND LOCKING COLLET

John O. King, Jr., 3990 N. Ivy Rd., Atlanta, Ga. 30342

Continuation-in-part of Ser. No. 542,077, Jan. 17, 1975, abandoned, and Ser. No. 542,076, Jan. 17, 1975, Pat. No. 3,962,775, and Ser. No. 542,074, Jan. 17, 1975, Pat. No. 3,965,792, and Ser. No. 554,762, Mar. 3, 1975, abandoned. This application Feb. 3, 1976, Ser. No. 654,756
The portion of the term of this patent subsequent to Jun. 29, 1993, has been disclaimed.
Int. Cl.² F16B 35/04
U.S. Cl. 85—1 P **16 Claims**



1. A fastener assembly adapted to be installed in aligned holes with an initial minimum diameter through work pieces comprising:

an elongate fastener having a fastener axis, a maximum bearing diameter and a leading end, and including a substantially rigid pintail connector at the leading end thereof coaxially aligned with the fastener axis, said pintail connector having a connector diameter smaller than the fastener maximum bearing diameter;

a substantially rigid pintail having a leading end and a trailing end and including connection means for removably connecting the trailing end of said pintail to said pintail connector when said pintail is coaxially aligned with and leading said fastener, the connection between said pintail and said pintail connector having sufficient strength for said fastener to be pulled into the holes by axially pulling on said pintail when the maximum bearing diameter of said fastener is larger than the initial maximum diameter of the holes through the work pieces, said pintail having a maximum pintail diameter smaller than the fastener maximum bearing diameter, said connection means on said pintail disconnectable from said pintail connector on said fastener by generally transverse movement of said pintail out of coaxial alignment with said fastener; and

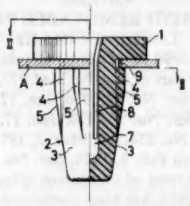
a locking collet slidably received over said connection means on said pintail and said pintail connector on said fastener when said connection means on said pintail is connected to said pintail connector on said fastener with said pintail coaxially aligned with said fastener to positively prevent transverse movement of said paintail with respect to said fastener and thus positively yet removably lock the connection between said pintail connector and said connection means on said pintail with said pintail coaxial with said fastener so that said fastener and pintail act as an integral unit until said locking collet is slidably removed from said pintail connector to release said connection means from positive connection with said pintail connector, said locking collet sized to pass through said holes leading said fastener when said fastener is pulled into the holes by axially pulling on said pintail.

4,077,300

PLASTIC SCREW GROMMET

Tohru Yoda, Yokohama, Japan, assignor to Nifco Inc., Tokyo, Japan

Continuation of Ser. No. 504,017, Sep. 9, 1974, abandoned. This application Apr. 5, 1976, Ser. No. 673,496
Claims priority, application Japan, Sep. 10, 1973, 48-105084
Int. Cl.[2] F16B *13/04*
U.S. Cl. 85—80 4 Claims



1. In a closed end one-piece plastic screw grommet comprising in combination a flange head, a polygonal leg perpendicularly extending downwardly from the underside of the said flange head, axially tapered engaging projections terminating in shoulder means on the outer sides of the said leg in spaced opposition to the underside of said head, a screw aperture extending inwardly through the topside of the said flange head and extending into and along the axis of the leg and terminating short of the free end thereof, axial grooves extending radially from the inner wall of the screw apertures towards but terminating short of each corner of said leg, the improvement which comprises forming longitudinally extending depressions in portions of the outer sides of the leg and surrounding the said engaging projections on at least the two axially disposed sides of said projections plus the portion of said leg between the shoulder means and said head, said leg having a resilient thin-walled configuration at those depressed portions of said leg, said depressions being angularly disposed inwardly relative to the axis of said leg in the direction of said head to provide the greatest flex in the outer sides of said leg adjacent said shoulder means, each said engaging projection joined throughout its length to and rising from the base of said depression and with at least the shoulder means extending laterally from said base beyond the juncture of the depression with the side of said leg.

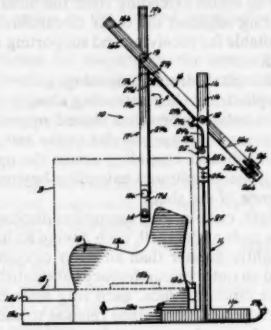
4,077,301

APPARATUS FOR CUTTING EXPANDED FOAM BLOCKS TO PROVIDE A PREDETERMINED SURFACE CONFIGURATION THEREON

Harry Brahm, P.O. Box 372 Riverside Station, Miami, Fla. 33135

Filed May 28, 1976, Ser. No. 691,141
Int. Cl.[2] B23C *1/16;* B26F *3/12*
U.S. Cl. 90—13.2 8 Claims

1. An apparatus comprising a stationary support, a movable frame assembly suspended from said support, a taut wire-like cutter supported at opposite ends by said movable frame assembly for vertical and horizontal movement, a changeable template having a periphery formed with a predetermined contour lying in a vertical plane and extending horizontally in parallel relation to said movement of said cutter, follower means carried by said frame assembly to engage said template periphery for guiding the cutter along said predetermined contour, a platform located beneath said movable frame assembly for supporting a block of expanded plastic foam to be cut by said cutter, means for locating said block on said platform with respect to said cutter and template in position for cutting a surface therein having said predetermined contour, said movable frame assembly including a first frame pivoted at a midportion thereof to said stationary support on a first horizontal axis, said first frame being normally inclined and having an upper portion projecting above said platform, a second frame pivotally suspended from said first frame upper portion on a second horizontal axis spaced from said first axis, said second frame having an open button end across which said cutter extends for said opposite end support thereby, said vertical and horizontal movement of said cutter by said



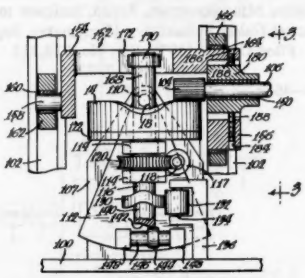
movable frame being accomplished by pivoting of said first frame to vertically raise and lower said second axis, second frame and cutter, and the pivoting of said second frame to swing said cutter back and forth horizontally, and electric power means for energizing said cutter to effect said cutting.

4,077,302

APPARATUS FOR MACHINING END HOUSINGS FOR SLANT AXIS ROTARY MECHANISMS

Paul J. Staebler, Dunlap, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 13, 1977, Ser. No. 796,569
Int. Cl.[2] B23C *3/02;* B24B *17/02*
U.S. Cl. 90—13.9 9 Claims



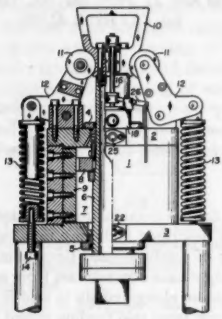
1. In an apparatus for machining the end walls of slant axis rotary mechanisms including a base; a support pivoted on said base for rotation about a first axis; a shaft journalled on said support for rotation about a second axis nonparallel to said first axis; a work holder carried by said shaft for receiving a housing element of a slant axis rotary mechanism to have an end wall machined thereon; means, including a tool adjacent said work holder, operable to perform a machining operation on a housing element received on said work holder; means for rotating said shaft; and means responsive to rotation of said shaft for oscillating said support about said first axis in timed relation to rotation of said shaft, the improvement comprising: means for oscillating said shaft along said second axis at a desired rate to cause the end wall being machined to have a surface configurated to compensate for deflections occurring during operation of the machanism.

4,077,303

APPARATUS FOR GENERATING AN IMPACT FORCE

Peder Ulrik Poulsen, Loenholt Ladegaard, DK-3480 Fredensborg, Denmark

Filed Apr. 14, 1976, Ser. No. 676,867
Int. Cl.[2] F01L 15/00; F01B 7/18
U.S. Cl. 91—50 2 Claims



1. Apparatus for generating an impact force, comprising:

a pressure chamber;

a piston slidably movable within the chamber, said piston extending through the opposite end walls of said chamber, the cross-sectional area of the piston at one end of the chamber being greater than the cross-sectional area thereof at the other end of said chamber, said piston having a generally vertical longitudinal axis, a lower end adjacent said one end of said chamber, and an upper end adjacent said other end of said chamber, said ends of said piston being outside said chamber;

means for connecting a tool to said lower end of said piston;

an inlet conduit for introducing a fluid into said chamber under pressure, said fluid acting on said piston to exert an axial force thereon in a given direction;

means connected in operative engagement with the upper end of said piston for releasably gripping said piston to prevent axial movement thereof when said axial force is below a predetermined value, and to suddenly release said piston to permit axial movement thereof in said given direction when said axial force exceeds said predetermined value, said releasable gripping means comprising a cam affixed to the upper end of said piston, and a cam follower roller engaging said cam, spring means for biasing said roller into contact with said cam, so that said roller exerts an upward force on said cam, and

means for reducing the pressure of said fluid in said chamber by removing fluid therefrom, and for moving said piston in a direction opposite to said given direction, when the piston has moved in the given direction towards the end with the larger cross-section following release of the gripping means.

4,077,304

IMPACT TOOLS

John V. Bouyoucos, Rochester, N.Y., assignor to Hydroacoustics Inc., Rochester, N.Y.

Filed Mar. 15, 1976, Ser. No. 666,733
Int. Cl.[2] F01B 7/18; F01L 25/04, 17/00
U.S. Cl. 91—276 39 Claims

1. An impact tool for producing percussive forces which are repetitive at selected frequencies, said tool comprising:

a hammer,

a valve element,

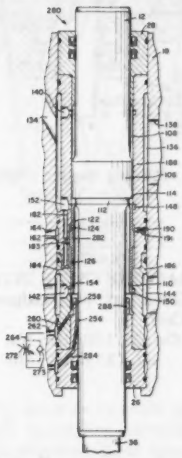
said hammer and valve element being movably disposed together in a chamber and having freedom to travel independently,

means for conducting with said valve element pressurized fluid into and out of said chamber for developing forces upon said hammer to effect oscillatory movements of said hammer in opposite directions,

said conducting means including a pair of ports communicating with said chamber, said valve element being disposed in switching relationship with said ports to open one of said ports and close the other of said ports when said valve element moves in one of said opposite directions past a first switching position and to close the one of said ports and operate said other port when said valve element moves in the other of said opposite directions past a second switching position,

means for mounting said valve element in said chamber for movement in said opposite directions beyond said switching positions,

said hammer being engageable with said valve element to effect movement thereof in said one of said opposite direc-



tions to carry said valve element beyond said first switching position such that said pressurized fluid is conducted with respect to said chamber to develop forces upon said hammer in the other of said opposite directions which limit the movement of said hammer in said one direction without said valve element physically limiting the freedom of movement of said hammer in said one direction, and

pressurized fluid applying means for developing and controlling the net pressurized fluid forces upon said valve element only in the other of said opposite directions to effect movement of said valve element in the other of said opposite directions past said second switching position such that said pressurized fluid is conducted with respect to said chamber to develop forces upon said hammer in said one direction a predetermined time after said hammer engages said valve element.

4,077,305

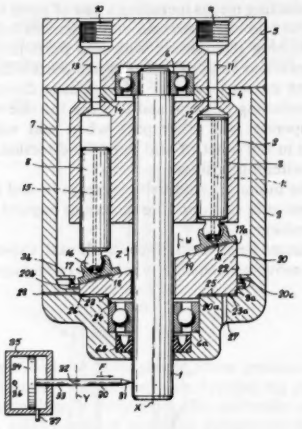
HYDRAULIC PISTON MOTOR

Hans Waldemar Stuhr, Aschaffenburg, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Jul. 29, 1976, Ser. No. 709,907
Claims priority, application Germany, Aug. 2, 1975, 2534688
Int. Cl.[2] F01B 13/04
U.S. Cl. 91—486 17 Claims

1. A hydraulic piston motor comprising a shaft; cylinder means operatively connected with said shaft and forming at least one cylinder; a piston hydraulically reciprocable in said cylinder for rotating said shaft; and temporarily effective start-promoting means effective upon hydraulic pressurization of said cylinder prior to rotation of said shaft to impart to a member acting upon said piston and thereby to said piston an initial

relative movement between said piston and said cylinder to break adhesive static friction therebetween and thereby decrease the friction retarding starting displacement of said piston.

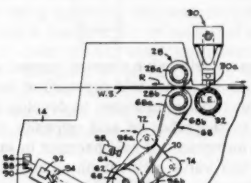


4,077,306

BAG MACHINE CYCLE INTERRUPT

Robert J. Wech, Green Bay, Wis., assignor to FMC Corporation, San Jose, Calif.

Filed Oct. 21, 1976, Ser. No. 734,703
Int. Cl.[2] B31B *1/10*
U.S. Cl. 93—8 R **11 Claims**



1. A thermoplastic bag making machine for operation on a supply roll of thermoplastic web which is unwound and a selected portion thereof being fed, by intermittently rotating draw rolls, to a heated reciprocating bar operable, in cooperation with an underlying rotatable seal roll, to sever and seal the web and thereby produce, from the selected portion of the web fed by the draw rolls, a bag of desired dimensions, said draw rolls continue their intermittent rotation for a pre-selected number of machine cycles and are thereupon interrupted and rotated in the direction opposite to the web feed direction to, respectively arrest web feeding and retract the leading edge of the web away from the reciprocating heated bar;

the improvement in apparatus for rotating the draw rolls in the opposite direction comprising an endless flexible tension member, being connected to the bag machine drive train, for rotating said draw rolls;

means engageable with a selected reach of said tension member, for increasing the tension of said tension member;

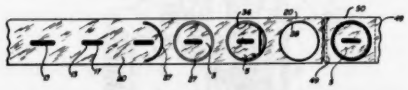
and means, responsive to the selected number of machine cycles or at the command of the operator, for operating said tension increasing means to effect rotation of said draw rolls in said opposite direction and thus retract the leading edge of the web from the plane in which said heated bar reciprocates.

4,077,307

MANUFACTURING APPARATUS FOR FABRICATING A DISPOSABLE CRUST ROLLING FORM

George B. Davis, Jr., 7512 Marbury Road, Bethesda, Md. 20034

Filed Sep. 22, 1976, Ser. No. 725,448
Int. Cl.[2] B31B *41/00*
U.S. Cl. 93—18 **14 Claims**



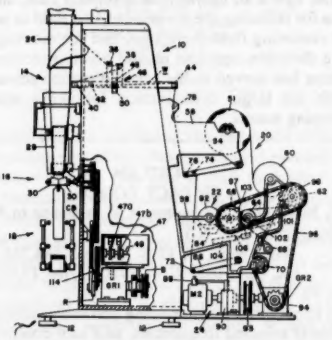
1. Apparatus for the manufacture of a piecrust rolling form of the character described including first feeding means feeding a first layer of thinly formed flexible material in a given direction, incising means downstream from said feeding means operable to incise an elongated slit in said first layer, applying means downstream from said feeding means operable to apply an identifying means to said layer in an area enclosing said slit, second feed means downstream from said applying means operable to juxtapose a second layer of thinly formed material against said incised layer of flexible material, sealing means downstream from said second feed means operable to secure together the said layers of material to form therebetween an enclosed wafer-like receptacle into which extends said elongated slit with the configuration of the secured together surfaces of the material defining the edge and outer configuration of the receptacle, separating means downstream from said securing means operable to separate said receptacle from said layers of material, weakening means operable to weaken a portion of the material of the receptacle in close inner adjacency to said edge, forming means operable to extend into the material forming said receptacle a plurality of air passing ports said weakening means and said forming means being positioned intermediate said sealing means and said separating means.

4,077,308

CONTROL FOR BAG MAKING MACHINE

John W. Scully, Quincy, Mass., assignor to Pneumatic Scale Corporation, Quincy, Mass.

Filed Jun. 4, 1976, Ser. No. 692,958
Int. Cl.[2] B31B *23/60*
U.S. Cl. 93—19 **7 Claims**



1. In a bag-making machine wherein a web of material is delivered to a mandrel for forming into a tube and from thence to a sealing means for activating an adhesive on the web which is printed thereon in the form of longitudinally spaced parallel bands of adhesive extending transversely of the web at inter-

vals corresponding to the bag lengths to be formed, each band comprising two narrow strips of adhesive between which there is a gap devoid of adhesive, means for forming the web into a tube, feeding means, means for advancing the tube to the sealing means for activating the band of adhesive to simultaneously form the top of one bag and the bottom of the next, photosensitive means upstream of the sealing means a distance corresponding to a predetermined whole number of bag lengths, first and second switch means, a cam shaft, first and second cams on the cam shaft arranged, respectively, to open the first switch means and, by opening of the first switch means, to disable the feeding means and thereafter to open the second switch means and, by opening of said second switch means, to enable the feeding means, said cam means being sufficiently spaced apart such that the photosensitive means is sensitive only to said first strip of each band of adhesive.

4,077,309

APPARATUS FOR CLOSING LINED BOXES

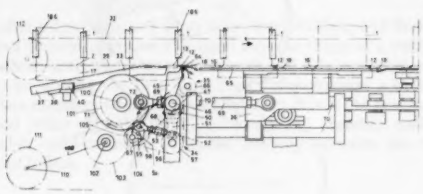
Jakob Marbot, Schaffhausen, Switzerland, assignor to S I G Scheizerische Industrie-Gesellschaft, Neuhausen am Rheinfall, Switzerland

Filed Feb. 9, 1977, Ser. No. 767,030

Claims priority, application Switzerland, Sep. 2, 1975, 11334/75

Int. Cl.² B65B *7/06*

U.S. Cl. 93—27 **10 Claims**



1. In an apparatus for closing an open end of a folded cardboard box which has oppositely disposed wide flaps and oppositely disposed narrow flaps connected to the box by crease lines at the open end; the cardboard box further having a glued-in lining projecting outwardly of the box beyond the crease lines; the apparatus having conveyor means on which the boxes are advanced serially and spaced from one another; a wide flap opener for outwardly bending the wide flaps; the improvement comprising

a. a lining spreader disposed downstream of said wide flap opener and including a spreader finger;

b. first drive means connected to said spreader finger for rotating said spreader finger and cyclically introducing it into the opening of the serially advanced cardboard boxes for spreading and partially flattening a leading end of said lining;

c. a pressure shuttle carrying two pressure rails for movement downstream of said lining spreader; said pressure rails bilaterally cooperating with the lining precedingly handled by said lining spreader for completing the flattening of the lining;

d. second drive means for imparting a reciprocating motion to said pressure shuttle for effecting a reciprocating motion of said pressure rails;

e. means for coordinating the motions of said spreader finger with said pressure shuttle;

f. means for synchronizing the motion of said conveyor means with the motions of said spreader finger and said pressure shuttle;

g. an arm having one end rotatably coupled to said first drive means and another, forked end; said spreader finger being pivotally attached to said arm; and

h. a spring urging said arm against a tine of said forked end.

4,077,310

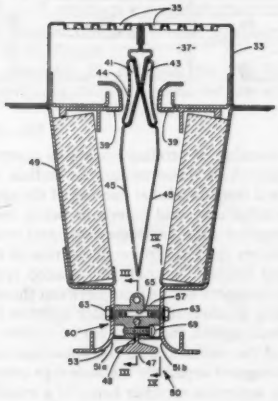
AIR CONDITIONING TERMINAL ASSEMBLY

Frank J. McCabe, Jr., Tyler, Tex.; Milton H. Coleman, East Syracuse, and Carl C. Herb, Camillus, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Continuation of Ser. No. 447,603, Mar. 4, 1974, abandoned. This application Feb. 7, 1977, Ser. No. 766,324

Int. Cl.² F24F *13/08*

U.S. Cl. 98—40 D **1 Claim**



1. An assembly for use in an air conditioning system having supply air terminals comprising vertically extending plate members mounting inflatable bellows operable to regulate the flow of air from said terminal and return air terminals, said assembly being suitable for use in said return air terminal and in said supply air terminal, said assembly comprising:

a first member having an outwardly flared lower portion and an upstanding leg projecting upwardly from said lower portion;

a second member spaced apart from said first member and having an outwardly flared lower portion and an upstanding leg projecting upwardly from said lower portion;

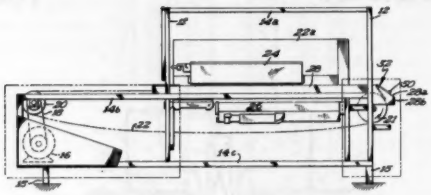
a third member interposed between said first and second members, and having a generally upstanding leg spaced from said upstanding legs of said first and second members, said first and third members defining a first air passage therebetween and said second and third members defining a second air passage therebetween, said first and second passages adapted to direct air downwardly therethrough when said assembly is employed in a supply air terminal, and said passages adapted to direct air upwardly therethrough when said assembly is employed in a return air terminal; and

a single unitary joining member interconnecting said first, second and third members to form an integral assembly, said joining member including a pair of opposed faces and a body portion having an axially extending slot disposed midway between said opposed faces, said upstanding leg of said third member being disposed within said slot, said opposed faces being in intimate contact with the opposed surfaces of said first and second members, said joining member being in vertical alignment with and spaced below said generally vertically extending plate members when said assembly is employed in said supply air terminal.

4,077,311
FOOD ROASTING OR BOILING APPARATUS AND METHOD

Kenneth L. Womack, Miami, Fla., assignor to The Pillsbury Company, Minneapolis, Minn.

Filed Jan. 19, 1977, Ser. No. 760,494
Int. Cl.[2] A47J *37/00*
U.S. Cl. 99—355 4 Claims

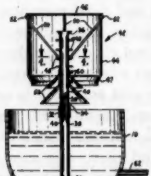


1. A food roasting or broiling apparatus comprising a supporting framework, a drive motor, an endless conveyor to convey the food from an inlet at one end of the apparatus to an outlet at the other end, said conveyor being coupled to the motor and mounted upon the framework, said conveyor being adapted to convey the food from one portion of the apparatus to another and having longitudinally spaced apart generally parallel cross members with spaces between them, a separator means including an elongated separator member for exerting a downward force against the upper surface of the conveyor in the vicinity of the outlet end of the apparatus means yieldly biasing the elongated separator member into contact with the conveyor, the separator member being of a smaller cross sectional size than the spaces between cross members of the conveyor to thereby fit into the spaces between the cross members of the conveyor, whereby when the conveyor is advanced the separator member will ride up and fall down repeatedly into the space between each of the cross elements of the conveyor and pass between the conveyor and the food in the general vicinity of the oulet end of the apparatus to thereby strike the food so as to joggle it away from the conveyor as the conveyor is advanced past the separator.

4,077,312
DEVICE FOR IMPARTING SMOKE FLAVOR TO LIQUIDS

Wesley E. Howard, 4000 Adams, Kansas City, Kans. 66103

Continuation-in-part of Ser. No. 682,756, May 3, 1976, abandoned. This application Oct. 26, 1976, Ser. No. 735,384
Int. Cl.[2] A23B *1/00*; B01D *19/00, 39/00, 41/00*
U.S. Cl. 99—471 10 Claims



1. Apparatus adapted for use in a smoky environment at atmospheric pressure and temperature to impart smoke flavor to a prepared liquid food product, said apparatus comprising:

an open topped container for containing the liquid food product;

a liquid conduit communicating with said container near the center of the latter and extending thereabove, said conduit having an upwardly facing outlet located above said container and facing away from said container;

means for forcing said liquid food product from the container through said conduit and out of the outlet thereof at atmospheric temperature, said means imparting sufficient velocity to said liquid food product to force the latter upwardly and outwardly away from said outlet;

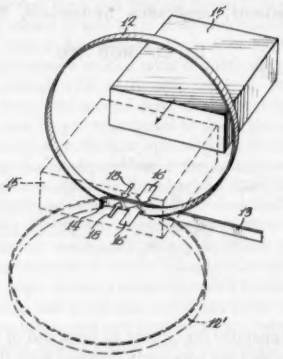
a hood member open at the bottom and having a top located above said outlet and sides for deflecting liquid flowing out of the conduit outlet; and

means supporting said hood member above said container with the outlet of said conduit disposed within the sides of said hood member and below the top thereof.

4,077,313
METHOD OF TENSIONING AND JOINING A FORMED STRAP LOOP ABOUT A PACKAGE

Peter Lems, Wilmette, and Nelson Cheung, Arlington Heights, both of Ill., assignors to Signode Corporation, Glenview, Ill.

Filed Dec. 20, 1976, Ser. No. 752,289
Int. Cl.[2] B65B *13/02*
U.S. Cl. 100—2 13 Claims



1. A method of tensioning and securing a strap loop about a package, said strap loop formed between a free end of a length of strap and a standing portion of said length of strap with a portion of the strap loop overlapped by said free end, said method comprising:

restraining said free end and an overlapped portion of the loop in an orientation to maintain a region of overlap;

effecting relative movement between said package and said strap loop to locate the loop about said package;

effecting relative twisting movement of the strap between said region and the balance of the loop to orient one edge of the strap in said region nearer the center of the loop than the other edge;

tensioning said length of strap to tighten the loop about the package; and

joining said free end and an overlapped portion in said region.

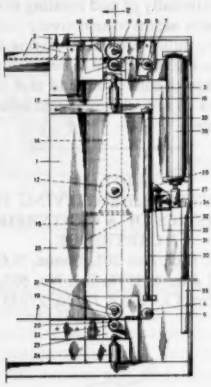
4,077,314
WIRE OR BAND STRAPPING MACHINE

Wilhelmus F. S. M. van Wegen, Maartensdijk, Netherlands, assignor to Metaverpa N.V., Netherlands

Filed Oct. 21, 1976, Ser. No. 734,380
Int. Cl.[2] B65B *13/10*
U.S. Cl. 100—26 1 Claim

1. Wire or band strapping machine, comprising means for guiding a wire or band about a looped path, means for feeding the wire or band comprising a driven roller, a freely rotatable roller and means for urging said freely rotatable roller towards said driven roller, means for reversing the direction of move-

ment of the wire or band to withdraw the wire or band to tighten the wire or band about an object to be strapped, said means as well comprising a driven roller at a freely rotatable roller and means for urging said freely rotatable roller towards said driven roller, said last mentioned roller rotating relative to the band in a direction opposite to the direction of the first mentioned feed roller, said first mentioned roller being disposed a distance above said second driven roller, an endless



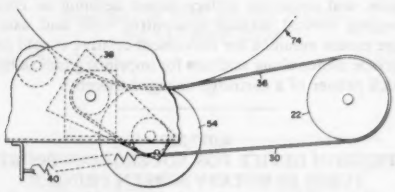
member interconnecting both said driven rollers, and further rollers deflecting the wire or band into the shape of a vertical U, whose horizontal legs pass through said driving means, and a motor driving the first mentioned roller through a second endless member, wherein the motor only drives the first mentioned roller directly through said second separate endless member and the motor is placed halfway between the two driven rollers.

4,077,315

CYLINDRICAL BALER CONVEYOR

Gerald Franklyn Meiers, Ottumwa, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Jul. 2, 1976, Ser. No. 702,259
Int. Cl.[2] B30B *5/06*
U.S. Cl. 100—88 **6 Claims**



1. In a mobile agricultural machine for forming cylindrical bales having a frame and in which a bale-forming conveyor, having a plurality of side-by-side endless belts trained around a plurality of parallel rollers engages crop material so as to form cylindrical bales, the conveyor having upper and lower runs, the upper run including a fixed roller and increasingly and deflectingly supporting a forming bale adjacent said roller, the improvement comprising:

a guide roller about which the belts are trained, engaging the inside of the lower run and having a cylindrical body and a plurality of axially spaced disks carried by the body and extending radially outwards from it, the axial spacing of the disks being somewhat greater than the width of a belt so that the tracking of a belt engaging the body between the disks is at least in part guided by the disks; and

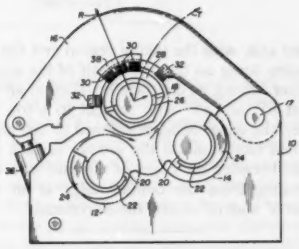
mounting means for the guide roller carried by the frame and including automatic belt tensioning means biasing the guide roller generally downwards, the guide roller being located adjacent the fixed roller immediately below the forming bale so that as the upper run provides increasing and deflecting support for the forming bale, an increase in belt tension results, overcoming the biasing of the tensioning means and forcing the guide roller to move upward so that the disks pass between the belts in the upper run, the guide roller thus contacting and providing support for the growing bale.

4,077,316

SUGAR CANE MILL

Jean Pierre Georget, Denain, France, assignor to Fives-Cail Babcock, Paris, France

Filed Jul. 28, 1976, Ser. No. 709,310
Claims priority, application France, Jul. 29, 1975, 75.23567
Int. Cl.[2] B30B *3/04*
U.S. Cl. 100—163 R **9 Claims**



1. A sugar cane mill comprising the combination of

1. two support beds,
2. two lower cylinders, each lower cylinder being mounted on a respective one of the support beds,
3. two cover members, each cover member being pivotally mounted on a respective one of the support beds,
4. two bearings,
5. an upper cylinder having an axis and carried by the two bearings, and
6. at least one elastically deformable block connecting each bearing to a respective one of the cover members, the block or blocks being arranged to permit movements of the upper cylinder with respect to the cover members in a direction approximately perpendicular to the plane defined by the axis of the upper cylinder and the resultant of the pressure forces during normal operation of the mill, and the block or blocks extending on either side of the plane.

4,077,317

APPARATUS FOR IMPRINTING AN ELONGATED MEMBER

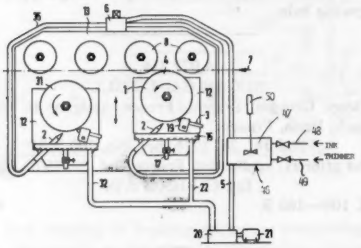
Werner Kiesewetter, Neustadt; Emil Bernhardt, Thann, and Robert Hutterer, Haarbrucken, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Germany

Filed Nov. 4, 1975, Ser. No. 628,817
Claims priority, application Germany, Nov. 4, 1974, 2452636
Int. Cl.[2] B41F *9/10*
U.S. Cl. 101—37 **6 Claims**

1. Apparatus for imprinting the surface of an elongated member moving at high speed, the apparatus including a rotatable printing wheel having a rim having edges formed with a circumferential groove conforming to the surface to be imprinted and depressed printing markings formed in the surface of the groove; means for engaging the rim of the printing wheel in tangential, non-slip, frictional contact with the elongated member while the member is drawn longitudinally at

high speed; a nozzle positioned for aiming an ink jet at a region of the grooved rim of the wheel spaced from the area of contact with the elongated member, the nozzle producing an ink jet having an aperture angle within the edges of the rim; and a wiper disposed in a direction against the direction of wheel rotation, contacting the wheel at a location following the inking region, wherein the improvement comprises:

the printing wheel being mounted for rotation about a horizontal axis, with the inking region and the wiper contact location being on the lower half of the wheel, and



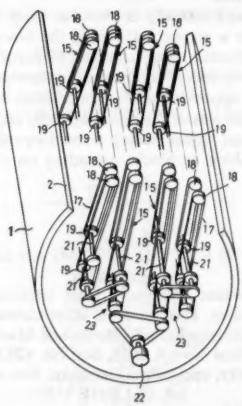
the wiper having an end face bevelled at an angle between about 65° and 85° with respect to a top surface of the wiper, the wiper being positioned so that an upper edge of the end face contacts the groove surface of the printing wheel between the edges of the rim, with the top surface extending from the contact edge at an angle between about 3° and 10° below the horizontal.

4,077,318

APPARATUS FOR PRINTING UPON MOVING SHEETS, PAPER OR THE LIKE WITH AUTOMATIC TYPESETTING

Shinkichi Tamai, Kobe, Japan, assignor to Kobe Dockyard & Engine Works, Ltd., Japan

Filed Apr. 20, 1976, Ser. No. 678,541
Claims priority, application Japan, Apr. 21, 1975, 50-48801
Int. Cl.[2] B41J *1/20;* B41F *17/00*
U.S. Cl. 101—37 **14 Claims**



1. An apparatus for printing upon an article comprising;

a rotating drum having an opening in its periphery,

a rotating shaft in said drum,

at least one drive pulley in said drum engageable with said rotating shaft,

guide means in said drum spaced from said drive pulley and adjacent said opening,

at least one endless belt having a plurality of spaced type sections disposed therealong, trained over said drive pulley and said guide means and movable through a path bringing a selected one of said plurality of type sections into a position aligned with said opening,

transmission means selectively connectable between said drive pulley and said rotating shaft for engaging said drive pulley with said rotating shaft to move said endless belt and position a selected one of said type sections in said opening,

control means externally of said rotating drum for activating said transmission means to selectively connect and disconnect said drive pulley and said rotating shaft; and

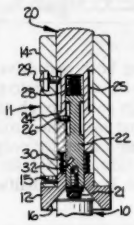
means for advancing the article to be printed into association with the surface of said drum and said selected type section to impress an impression of said selected type section onto the article.

4,077,319

APPARATUS FOR IDENTIFYING THE LOAD CHARACTERISTICS OF A CENTERFIRE FIREARM CARTRIDGE

John H. Edmisten, P.O. Box 201, Boone, N.C. 28607

Filed Jun. 4, 1976, Ser. No. 692,844
Int. Cl.[2] B41F *17/16, 17/36*
U.S. Cl. 101—41 **5 Claims**



1. Apparatus for imprinting, onto an unstruck primer of an elongate centerfire firearm cartridge, indicia identifying the load characteristics of the cartridge and comprising means for receiving a head portion of a cartridge and including centering surface means for positioning an unstruck primer disposed in a cartridge head primer pocket in alignment with a predetermined axis and the cartridge generally co-directionally with said axis, said centering surface means defining an inwardly converging conical surface concentric with said axis, and plunger means mounted for movement relative to said centering surface means along said axis for imprinting indicia onto an unstruck primer of a cartridge engaged thereby.

4,077,320

SUSPENSION DEVICE FOR SQUEEGEE-SUPPORTING TUBES IN ROTARY SCREEN PRINTER

Roger Weber, Pfastatt, and Andre' Lotte, Mulhouse, both of France, assignors to Societe Alsacienne de Constructions Mecaniques de Mulhouse, Mulhouse Cedex, France

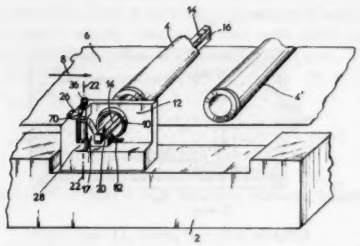
Filed Jul. 23, 1976, Ser. No. 708,007
Claims priority, application France, Aug. 12, 1975, 7525047
Int. Cl.[2] B41F *15/44*
U.S. Cl. 101—119 **6 Claims**

1. A suspension device for a squeegee-supporting tube in a horizontal, cylindrical rotary screen of a printing machine having a printing head, said rotary screen having a rotational axis, said suspension device comprising:

a substantially horizontal arm having a vertically unobstructed horizontal upper face, said arm being mounted for pivotal movement on a vertical axis laterally offset with respect to the rotational axis of said cylindrical rotary-screen, by a distance sufficient to permit clear lateral access to the end of said cylindrical screen;

releasable-securing means on the distal end of said arm upper face, releasably securing one end of said squeegee-supporting tube on said horizontal upper face of said arm for permitting said tube end to be readily disengaged from said arm;

support means on said printing head positively supporting said pivoting arm for free pivotal movement; and



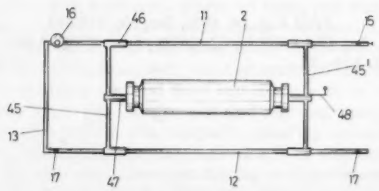
adjusting means adjustably positioning said support means along said vertical axis with respect to said printing head, whereby release of said releasable-securing means from said squeegee-supporting tube permits said arm to be pivoted on said vertical axis away from the end of said cylindrical screen so that ready access is attained to the squeegee so that the squeegee can be readily removed and/or replaced by withdrawal and insertion at the end of the exposed cylindrical screen.

4,077,321

ADJUSTABLE MOUNT FOR ROTARY SCREEN

Johannes Zimmer, Ebentalerstrasse 133, A-9020 Klagenfurt, Austria

Filed Sep. 24, 1976, Ser. No. 726,258
Int. Cl.² B41F *15/38*
U.S. Cl. 101—128.1 **13 Claims**



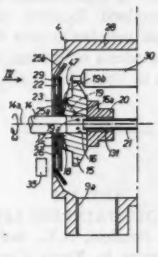
1. A screen station for a rotary screen-type printing machine comprising: a frame for carrying a rotary screen, said screen having an axis, said frame including two struts disposed parallel to said axis and four feet mounted on said struts abuttable against a support and supporting said frame, a first of said feet including means for pivotably supporting said frame, and means providing relative horizontal slidable movement between said first foot and a second foot with respect to the support or a respective one of said struts said other two feet being movable relative to said support or a respective one of said struts.

4,077,322

METHOD FOR RAPID MARKING OF ARTICLES

Michel Fardeau, Aix-les-Miles; Louis Duthion, Paris, and Jean-Pierre Volat, Marseille, all of France, assignors to Hotchkiss Brandt Sogeme, Paris, France

Filed Oct. 10, 1973, Ser. No. 404,903
Claims priority, application France, Apr. 18, 1973, 73.14162
Int. Cl.² B41M *1/42, 1/12*
U.S. Cl. 101—129 **4 Claims**



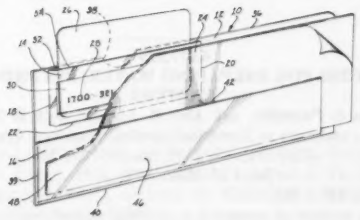
3. The method of rapidly applying discrete marks to articles which are moving with respect to the marking substances comprising the steps of (1) moving articles to be marked in a predetermined path; (2) accelerating by centrifugal acceleration a marking substance by rotation around an axis of a chamber containing said marking substance; (3) guiding said marking substance during said acceleration so as to continuously produce at least one jet of marking substance along a sweeping path; (4) ejecting said marking substance through guide orifices during a fraction of a revolution of said rotation toward said path of moving articles; (5) applying said jet of marking substance to said moving articles as discrete marks; and (6) deflecting said jet other than at the interval timed to mark said article.

4,077,323

DOCUMENT HOLDER

Christy N. Liuzzo, Phoenix, Ariz., assignor to Valley National Bank, Phoenix, Ariz.

Continuation-in-part of Ser. No. 683,046, May 5, 1976, abandoned. This application Jun. 2, 1977, Ser. No. 802,792
Int. Cl.² B41F *3/50*
U.S. Cl. 101—407 R **3 Claims**



1. A document holder for use with an identification card imprinter for holding a card carrying on embossed message and the document to imprinted with the message in a fixed, predetermined relationship so that the message is imprinted at a predetermined location on the document; said document holder comprising:

(a) a flat base member having at least one smooth relatively hard face major surface;

(b) a rectangular, flexible flap bonded along three edges thereof to said base member to form a pocket for receiving a card between said flap and said base, said card bearing an embossed message thereon;

(c) said pocket having an aperture positioned over the location of said embossed message when said card is inserted in said pocket;

(d) a second flexible flap bonded along two edges thereof to said base to form a receptacle between said flap and said base for receiving a document to be imprinted with said message; and

(e) said pocket and said receptacle being positioned with respect to each other such that said document overlaps said aperture whereby said message is positioned underneath a predetermined location on said document; whereby, said base member retains the credit card and document and provides a supporting surface for imprinting the document by operation of the card imprinter.

4,077,324

METHOD OF FOUNTAINLESS LITHOGRAPHY

Thomas J. Pacansky, Penfield, N.Y., and James H. Becker, Denton, Tex., assignors to Xerox Corporation, Stamford, Conn.

Division of Ser. No. 485,404, Jul. 3, 1974. This application Feb. 12, 1976, Ser. No. 657,505

Int. Cl.[2] B41M *1/06, 1/14*

U.S. Cl. 101—450 **21 Claims**

1. A process for printing comprising applying an ink and a non-aqueous solvent to an imaged master and transferring the resultant developed image to a receiver member wherein the master comprises a suitable non-metal master substrate and a non-imaged contiguous surface layer of an elastomeric non-aqueous solvent swellable, crosslinked polymer, copolymer or mixture of polymers, said polymer, copolymer or mixture of polymers having an essentially hydrocarbon backbone which may contain heteroatoms selected from nitrogen, phosphorus, oxygen, sulfur, bromine, fluorine and chlorine with the halogen atoms only in a side chain; said solvent being capable of swelling the nonimaged areas of said elastomer but not capable of dissolving, diffusing into, or remaining on the imaged areas and wherein the solvent is added in an amount to diffuse into the non-imaged areas of said imaged master and form a substantially ink-free layer on the non-imaged areas of the master during inking and transferring of the inked image.

4,077,325

PROCESS FOR PREPARING WATERLESS PRINTING MASTERS

Thomas J. Pacansky, and Alan B. Amidon, both of Penfield, N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Mar. 10, 1977, Ser. No. 776,382

Int. Cl.[2] B05D *5/00, 1/36*

U.S. Cl. 101—467 **5 Claims**

1. A method of preparing a printing master comprising:

a. providing a self-supporting master substrate;

b. providing a block film forming ink releasing copolymer consisting of from 10 to 20 weight percent polyalphamethylstyrene having a molecular weight of between 6,000 and 11,000 and from 90 to 80 weight percent polydimethylsiloxane;

c. coating said substrate with said copolymer;

d. depositing an ink accepting particulate material in image configuration on said master;

e. heating the master to crosslink the siloxane blocks and soften the styrene blocks; and

f. allowing the coating to cool so as to bond the particulate imaging material to the master.

4,077,326

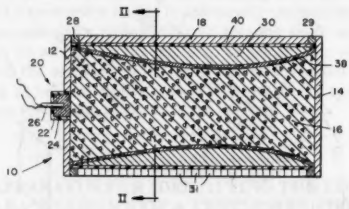
IMPULSE COMPENSATED CONTINUOUS ROD WARHEAD

Albert G. Funk, and Gary L. Hansen, both of Salt Lake City, Utah, assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 19, 1970, Ser. No. 24,911

Int. Cl.[2] F42B *13/48*

U.S. Cl. 102—67 **5 Claims**



1. An impulse compensated continuous rod warhead comprising:

a pair of end plates;

a cylindrical explosive charge mounted between the end plates for providing an outward explosive impulse;

a plurality of continuous rods mounted in parallel lengthwise fashion about the charge;

an annular buffer disposed between the charge and the rods;

said buffer having a varying mass between its ends so that impulse variation from the transient explosive reaction is substantially evened out before being applied to the rods;

said end plates being constructed of metal with sufficient mass to substantially reduce end losses for maximum radial impulse;

a detonator extending through one of the end plates and located at the center of the respective end of the charge;

the mass of the buffer progressing to a maximum at a point of maximum radial impulse which is located between the end plates approximately two-thirds of the length of the charge from the detonator end; and

the progression of the mass being monotonic and increasing throughout the entire distances between the end plates and said point of maximum radial impulse.

4,077,327

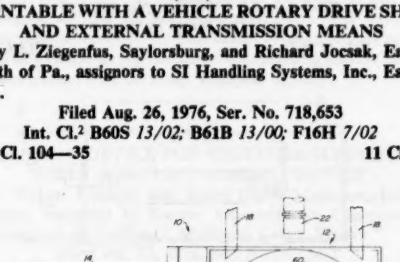
TURNTABLE WITH A VEHICLE ROTARY DRIVE SHAFT AND EXTERNAL TRANSMISSION MEANS

Barry L. Ziegenfus, Saylorsburg, and Richard Jocsak, Easton, both of Pa., assignors to SI Handling Systems, Inc., Easton, Pa.

Filed Aug. 26, 1976, Ser. No. 718,653

Int. Cl.[2] B60S *13/02;* **B61B** *13/00;* **F16H** *7/02*

U.S. Cl. 104—35 **11 Claims**



1. Apparatus for conveying vehicles comprising a turntable having a spaced set of tracks for supporting said vehicles and a rotatable drive tube for driving a drive means on said vehi-

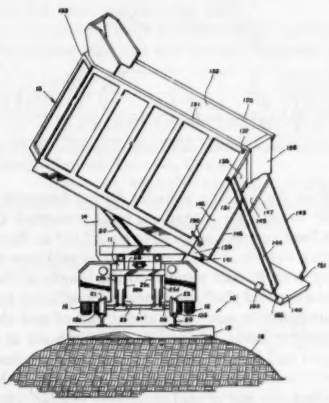
cles, said drive tube being disposed between said tracks, support structure supporting said table for movement about an axis perpendicular to the longitudinal axis of said tube, power means connected to said table for selectively causing such movement of the table, a main drive member concentric with the axis of movement of said table and below said table, at least one flexible member extending radially outwardly from said main drive member and then upwardly to said drive tube so that said main drive member may cause said tube to rotate about its longitudinal axis in all rotative positions of said turntable, and means drivingly coupled to said main drive member for rotating said main drive member about said axis.

4,077,328

ROTARY DUMP

Glenn Taylor, P.O. Box 93006 Martech Station, Atlanta, Ga. 30318

Filed Jun. 11, 1976, Ser. No. 694,925
Int. Cl.² B61D *7/10, 9/04, 9/12*
U.S. Cl. 105—261 A **10 Claims**



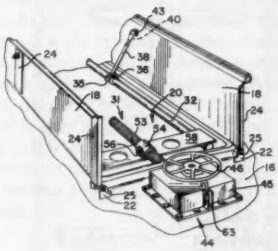
1. A load carrying vehicle comprising a framework, road wheels mounted on said framework for supporting said framework from a road surface railroad wheels mounted on said framework and movable up and down with respect to said framework for engaging the rails of a railroad and supporting said framework from a railroad, a load carrying dump body mounted on said framework, means for tilting said load carrying dump body about an approximately horizontal axis and dumping the load from said dump body, means for rotating said load carrying dump body about an approximately vertical axis for dumping the load from said dump body at various positions about the vehicle, said load carrying dump body comprising a bottom pan, sidewalls extending upwardly on opposite sides of said bottom pan and a front wall extending upwardly from said bottom pan defining an upper opening and a dump opening, a tail gate hingedly connected at its upper edge portion about an approximately horizontal axis to the upper portions of said sidewalls at the upper portion of the dump opening and movable to open and close the dump opening, an apron connected at one of its edge portions to the lower portion of said dump body at the lower edge of the dump opening, and a pair of wing plates each connected at one of its edge portions to one of said side walls at the side edges of the dump opening, whereby when the railroad wheels are engaged with the rails of a railroad, the load dumped from the dump body can be directed out to the side of the rails of the railroad by the apron and wing plates.

4,077,329

OPENING AND CLOSING MEANS FOR HINGED TROUGH COVERS ON HOPPER CARS

Franklin P. Adler, Michigan City, Ind., assignor to Pullman Incorporated, Chicago, Ill.

Filed Jul. 19, 1976, Ser. No. 706,976
Int. Cl.² B61D *7/24, 39/00*
U.S. Cl. 105—377 **12 Claims**



1. A railway hopper car having a roof including a longitudinally extending hatch opening, hatch cover means hingedly connected to said roof and movable from a closed position covering said opening to an open position, the improvement comprising:

an operating mechanism for moving said hatch cover means including;

a pair of longitudinally extending thrust bars attached to the roof adjacent the opening to define a top pour space between said thrust bars and movably supported with respect to said roof,

thrust element means rotatably supported on each of said thrust bars and fixed relative thereto against longitudinal movement,

said hatch cover means comprising a pair of hatch covers extending the length of the hatch opening,

link means pivotally connected at one end to said thrust element means and pivotally connected at its other end to one of said hatch covers;

and motor means connected to said thrust bars for moving the thrust bars longitudinally to open and close said hatch covers, whereby there is defined a pour space in the open position of the hatch cover means.

4,077,330

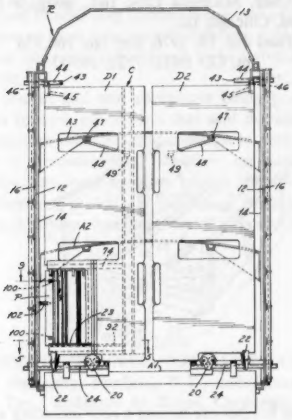
SLIDING PANEL FOR AN END DOOR OF A RAIL CAR

Israel D. Peisner, Huntington Woods, and Paul J. Ye, Melvindale, both of Mich., assignors to Whitehead & Kales Company, River Rouge, Mich.

Filed Aug. 24, 1976, Ser. No. 717,176
Int. Cl.² B61D *17/06, 19/00*
U.S. Cl. 105—410 **8 Claims**

1. A closure for an opening in a rail car comprising a door, means mounting said door on said rail car for movement between open and closed positions relative to said opening, a recess in said door, a panel, means mounting said panel for movement between a closed position relative to said recess and an open position relative to said recess, first panel operating means responsive to movement of said door to its open position for automatically moving said panel to its open position and retaining said panel in said open position when said door is in its open position, and second panel operating means responsive

to movement of said door to its closed position for automatically moving said panel to its closed position and retaining said



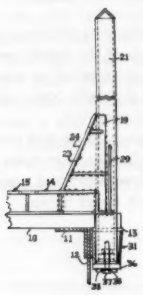
panel in said closed position when said door is in its closed position.

4,077,331

CARGO RACK

Emanuel Val Verde, Chicago, Ill., assignor to Transco Inc., Chicago, Ill.

Filed Jun. 1, 1976, Ser. No. 691,369
Int. Cl.[2] B61D *17/00*
U.S. Cl. 105—463 **4 Claims**



1. A cargo rack system for use upon a flat deck of a railroad car that provides along its vertical edges vertical stake sockets, comprising

a. an elongated rack having a base structure of a length greater than the width of the car and adapted to be removably carried upon the flat deck of the car so as to extend beyond the opposite longitudinal edges thereof,

b. said base structure providing a horizontal top and bottom surface and a fixed pair of tubular risers at opposite ends thereof, with said risers being of a length to provide portions extending above and below said base structure and the flat deck of the car,

c. means fixedly connecting said end risers to said base structure whereby a portion of each riser projects into the stake sockets provided along the longitudinal edges of the car,

d. means for removably connecting said end risers in the stake sockets so as to mount said rack across the flat deck of the car,

e. a plurality of vertically extending freight-retaining fingers each providing a horizontal base plate adapted to be supported by said top surface of said base structure, and

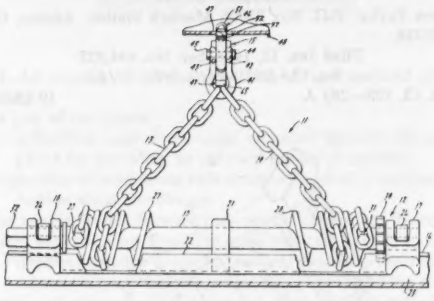
f. means for removably mounting said base plates of said fingers on said base structure to place said fingers in preselected positions longitudinally of said rack between said fixed end risers.

4,077,332

AUTOMOBILE TIE DOWN ASSEMBLY

Raymond M. Krokos, Detroit, Mich., assignor to Evans Products Company, Portland, Oreg.

Continuation-in-part of Ser. No. 542,616, Jan. 20, 1975, Pat. No. 4,022,134, which is a continuation-in-part of Ser. No. 457,817, Apr. 4, 1974, abandoned. This application Feb. 11, 1976, Ser. No. 657,175
Int. Cl.[2] B25B *25/00*; B60P *7/08*; B61D *45/00*
U.S. Cl. 105—477 **8 Claims**



1. A tie down for holding vehicles during transport on another vehicle having an extending track mounted thereon, comprising a base member adapted to be affixed to the track of the transporting vehicle, a shaft journaled by said base member and extending with its axis parallel to the length of the track, means for rotating said shaft, and means for affixing an end of a flexible transmitter to said shaft at one end of said shaft, the flexible transmitter being adapted to carry a hook at a place spaced from its end for providing a detachable connection to the transported vehicle at a point along the length of the track spaced from said one end of said shaft, said flexible transmitter being adapted to wrap around said shaft along its length from said one end of said shaft toward its other end for effectively shortening the length of said flexible transmitter and tying down the transported vehicle as said shaft is rotated.

5. A tie down for holding vehicles during transport on another vehicle comprising a base memer adapted to be affixed to the transporting vehicle, a shaft journaled by said base member, means for rotating said shaft, screw-like threads of opposite hands formed on said shaft at opposite ends thereof and extending toward each other, means for affixing a respective end of a flexible transmitter to said shaft at the respective ends of said screw-like portions, the flexible transmitter being adapted to carry a hook between its points of attachment to said shaft for providing a detachable connection to the transported vehiicle, said flexible transmitter being adapted to wrap around said shaft along said screw-like threads upon rotation of said shaft, said screw-like threads being adapted to maintain substantially the same angle between said flexible transmitter as said shaft is rotated and the transported vehicle is tied down.

4,077,333

ADJUSTABLE TABLE

George C. Ballas, 10515 Harwin Dr., Houston, Tex. 77036

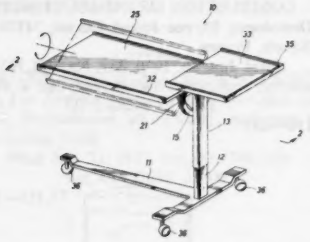
Filed Apr. 18, 1977, Ser. No. 788,155
Int. Cl.[2] A47F *5/12*
U.S. Cl. 108—6 **10 Claims**

1. An adjustable table having a base and an upright support member mounted on said base, comprising:

a horizontal support member rotatably connected at one extremity to said upright support member and extending outwardly therefrom,

a first table portion secured along one surface to said horizontal support member,

a first substantially vertically disposed frictional element secured to said upright support member,



a second substantially vertically disposed frictional element secured to said first table portion and positioned to engage said first frictional element, and

means cooperating with said horizontal support member for disengaging said first and second frictional elements.

4,077,334

PALLET CONSTRUCTION

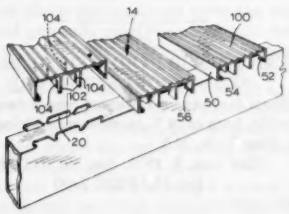
Ferdinand M. Svirklys, Toronto, Canada, assignor to Extrados Company Limited, Toronto, Canada

Filed Jul. 30, 1976, Ser. No. 710,236

The portion of the term of this patent subsequent to Jul. 27, 1993, has been disclaimed.

Int. Cl.[2] B65D *19/28*

U.S. Cl. 108—56.1 **25 Claims**



1. A pallet construction comprising:

at least two spaced-apart substantially parallel longitudinally-extending aluminum members,

a plurality of deck-forming aluminum members contacting and extending at least between the at least two longitudinally-extending members generally transverse thereto in spaced-apart relation,

each of said plurality of deck-forming members having at least one planar portion cooperating with the at least one planar portion of the others of said plurality of deck-forming members to provide a planar pallet deck surface which extends substantially the length of said longitudinally-extending members,

snap fit means releasably interconnecting said at least two longitudinally-extending members with each of said plurality of deck-forming members at the intersections thereof,

at each said intersection, said snap-fit means includes a first part integral with said longitudinally-extending member and a second cooperating part integral with said deck-forming member, and

stop means located at each said intersection and preventing movement of each of said plurality of deck-forming members longitudinally thereof and transverse to said at least two longitudinally-extending members while normally permitting movement of said plurality of deck-forming members out of contact with said longitudinally-extending members upon release of said snap-fit means to allow disassembly of said pallet,

said stop means at each said intersection including cooperating elements integral with said longitudinally-extending member and integral with said deck-forming member,

said snap-fit means including a first and second pair of spaced channels situated on said longitudinally-extending member, in each pair the channels opening in opposite directions in the direction of extension of the longitudinally-extending member, and channel-engaging members formed on each of said deck-forming members constructed to snap fit into said pairs of spaced channels,

said stop means at each said intersection comprising two projections on each of the longitudinally-extending members engaging respective openings is said deck-forming members.

4,077,335

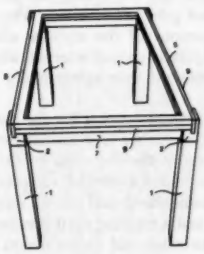
EXTENSIBLE TABLE

Umberto Luzzani, V. Febo Borromeo 5, Senago (Milan), and Giuseppe Riva, V. Monte Nevoso 3, Paderno Dugnano (Milan), both of Italy

Filed Dec. 8, 1976, Ser. No. 748,595

Int. Cl.[2] A47B *1/05*

U.S. Cl. 108—75 **3 Claims**



1 In an extensible table, of that kind which includes a rectangular frame constituted by two opposed spaced parallel longitudinal beams and two opposed spaced parallel cross beams, four legs arranged one at each corner of the frame, and two draw-out plates slidable into a first stacked position and a second position in which they are extended end-to-end, the improvement which comprises:

i. each said leg having a recess opening at its top end

ii. four shoulder elements each having a male portion engaged into the recess of a respective leg, and an upper L-shaped portion including two spaced vertical arms defining between them a cavity receiving an end of a longitudinal beam, and a recess receiving an end of a cross beam,

iii. roller means protruding from the upper end of a vertical arm of the L-shaped portion to carry the draw-out plates,

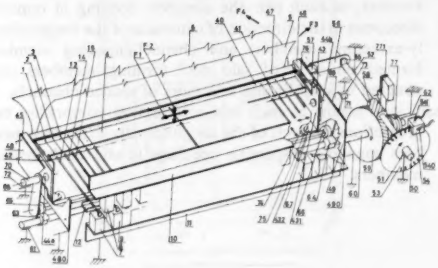
iv. the longitudinal beams each having on an inner face opposed to an inner face of the other longitudinal beam a respective mirror-image groove formation,

v. lateral roller means mounted on said draw-out plates and engaged in said groove formations.

4,077,336
PRINTING DEVICE FOR HIGH SPEED PRINTERS

Jean-Pierre Talvard, St-Germain-les-Corbeil; Bernard Flaceliere, Chatenay-Malabry, and Jacques Bunel, Vigneux-sur-Seine, all of France, assignors to Society Said: LOGABAX, France

Filed Jan. 15, 1976, Ser. No. 649,184
Claims priority, application France, Feb. 13, 1975, 75 04445
Int. Cl.[2] B41J 7/70
U.S. Cl. 101—93.05 6 Claims



1. An impact printer for forming dot patterns upon a movable document in a line by line fashion whereby a regular matrix of A dot lines by B dot columns defines each character, A and B being real integers greater than 1, comprising: a plurality of N elongated reciprocating styluses each having first and second ends, N being a number obtained by dividing the total number of characters in each line by a whole number including unity;

a plurality of N electromagnet means cooperating with the first ends of the respective styluses for driving the second ends thereof against the said document at high speed;

means for selectively energizing said electromagnet means;

first and second guide members by which the first and second end portions of the styluses are respectively supported at regularly spaced intervals along first and second imaginary straight lines substantially parallel to the dot lines;

said first guide member being fixedly mounted, whereas the second guide member is mounted for first reciprocating cyclic motion in the direction of the second imaginary straight line and for second reciprocating motion in a plane perpendicular to said second imaginary straight line;

motor means and a rotating shaft constantly rotated by said motor means when said motor means is energized;

first coupling means connecting the said shaft to the second guide member and adapted for converting the constant rotating motion of the said shaft into the said first reciprocating cyclic motion, the said first reciprocating cyclic motion being constant and having an amplitude corresponding to the line portion defined by the said total number of characters, divided by N;

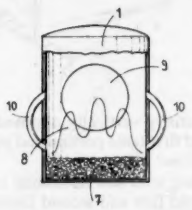
second coupling means connecting the said shaft to the second guide member and adapted for converting the constant rotating motion of said shaft into the said second reciprocating motion, the said second reciprocating motion including a plurality of discrete downward steps each starting before the end of one of the successive half cycles of the first reciprocating cyclic motion and ending after the beginning of the next half cycle, the number of steps in said plurality equalling A-1 and a single step return upward translatory alternation movement starting at the end of the last of the said successive half cycle and ending at the end of the next half cycle, the totality of said downward steps together forming a downward translatory alternation movement having an amplitude equalling the length of a column, the said means for selectively energizing the electromagnet means being operative only during those portions of the first reciprocating cyclic motion are comprised between the said discrete downward steps;

and means for effecting a step of motion of the movable document during the said upward translatory alternation movement.

4,077,337
METHOD AND INSTALLATION FOR CONTINUOUS COMBUSTION OF COMBUSTIBLES

Bernard Demoiseau, 11, rue Joseph-Cursat, 74100 Annemasse, Haute-Savoie, France

Filed Jun. 30, 1976, Ser. No. 701,293
Claims priority, application Switzerland, Jul. 4, 1975, 8715/75
Int. Cl.[2] F23G 5/00
U.S. Cl. 110—235 4 Claims

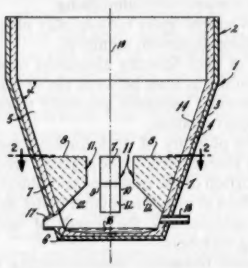


1. Method for the continuous combustion of mineral or organic combustibles, characterised by the steps of placing the said combustibles in a closed room, introducing a controlled volume of substantially pure oxygen, as a combustive into the closed room in the presence of water steam so that the gas emitted by the combustible during combination with the oxygen produce a primary effect constituting a semi-continuous explosion and as well producing a secondary effect comprising an atomization of the water and of the gas contained in the room.

4,077,338
SHAFT FURNACE FOR PYROLYSIS OF REFUSE WITH BED SUPPORT STRUCTURE

Thomas Gilbert Halvorson, Lockport, and Edward Paul Eardley, Getzville, both of N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Aug. 5, 1976, Ser. No. 711,789
Int. Cl.[2] F23G 7/00
U.S. Cl. 110—235 12 Claims



1. In a vertical shaft furnace for the pyrolysis of pelletized refuse, having a drying zone in the upper part, a pyrolysis zone in the mid portion, and a hearth for combustion and melting in the base of said furnace provided with means for supplying oxygen to said hearth, the improvement comprising a refuse bed support structure,

said support structure being located in the lower portion of the hearth but above the level of said oxygen supply

means, and comprising at least three cooled, refractory support members, extending radially inward from the hearth wall toward the axis of the hearth and having side wall surfaces,

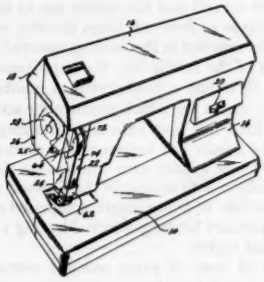
said support structure being characterized by having a plurality of peripheral spaces extending through said structure and converging in the downward direction, each of said peripheral spaces being formed at least in part by the side wall surfaces of adjacent support members and the inside surface of the hearth.

4,077,339

CARTRIDGE SEWING MACHINE ACCESSORY

Sidney Bass, Los Angeles; Herbert May, Torrance, and Hubert Allen Rich, Westminster, all of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 21, 1977, Ser. No. 761,380
Int. Cl.[2] D05B *23/00*
U.S. Cl. 112—121.27 **4 Claims**



1. In a cartridge for use with a sewing machine having a recessed surface in the side of the head thereof abuttingly receiving a first planar surface of the cartridge, the cartridge having a second generally parallel surface with interconnecting edges to define a housing having a reciprocable needle carrying member generally wholly contained within said cartridge the needle being reciprocable out through an aperture in the bottom of the cartridge, one of the interconnecting edges being a front edge of the cartridge, said cartridge comprising:

a recess formed within the upper portion of said cartridge adjacent the front edge;

means within said recess for receiving a spool of ribbon-like material with said cartridge separated from said sewing machine and for rotatably retaining said spool with said cartridge received in said recessed surface; and

channel means on the front edge of said cartridge adjacent the needle aperture for passage therethrough of said ribbon-like material in proximity to the needle.

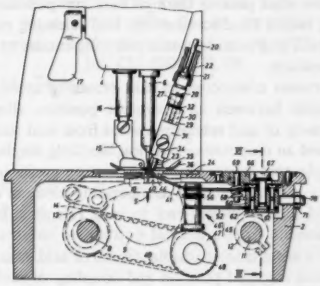
4,077,340

SEWING MACHINE HAVING WORKPIECE PREPUNCTURING DEVICE

Oskar Braun; Reinhold Dobner, both of Kaiserslautern; Knud Overlach, and Ludwig Pietzsch, both of Karlsruhe, all of Germany, assignors to Pfaff Industriemaschinen G.m.b.H., Germany

Filed Oct. 4, 1976, Ser. No. 729,019
Claims priority, application Germany, Oct. 3, 1975, 2544165
Int. Cl.[2] D05B *35/00*
U.S. Cl. 112—131 **11 Claims**

1. A sewing machine construction comprising a base portion, an arm portion overlying said base portion, a needle mounted in said arm portion for reciprocation over said base portion, a main sewing machine shaft rotatably mounted in said base portion, a workpiece advance plate connected to said shaft for movement by said shaft during rotation thereof in timed relationship to the movement of said needle and being connected to said needle to drive said needle in reciprocation, an insert slide on said base portion, a mounting member mounted for adjustable movement along said slide, a resilient support connected to said member, a ram carried by said resilient member, a rotatable cam driven by said main shaft and



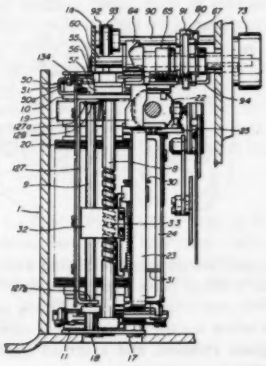
engageable with said ram to raise and lower said ram, a perforating tool mounted on said base portion, said base portion having a slot through which said tool reciprocates, a counter tool carried on said ram and being movable with said ram toward and away from the workpiece at the location of said slot for cooperative engagement with said perforating tool.

4,077,341

BUILT IN BUTTONHOLER FOR A SEWING MACHINE

Norboru Kasuga, Hachioji, Japan, assignor to Janome Sewing Machine Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 711,078, Aug. 2, 1976. This application Aug. 11, 1976, Ser. No. 713,573
Claims priority, application Japan, Aug. 19, 1975, 50/99756
Int. Cl.[2] D05B *3/02*
U.S. Cl. 112—158 B **18 Claims**



1. In a sewing machine wherein a shaft rotates relative to a machine frame in order vertically to reciprocate a needle and to rotate a pack of pattern cams, and wherein two cam followers are displaceable axially along said pack and are engageable radially with said cams for controlling the stitch pattern of said needle, a buttonholer comprising:

releasing means connectable to said pack and to said followers and rotatable by said pack from a starting position through predetermined first angular positions of said pack for displacing said followers from an engaged position riding on respective cams into a disengaged position clear of said cams only when said pack is in said first positions;

clutch means for coupling said releasing means to said packs;

shifting means connected to said releasing means for displac-

ing said followers axially along said pack each time said releasing means displaces said followers from said engaged to said disengaged position;

stopper means connected between said releasing means and said shifting means for disconnecting same from each other in a predetermined second position which said pack assumes after passing through said first position;

clearing means for disconnecting said releasing means from said pack and returning said releasing means to said starting position;

setting means connected to said releasing means and displaceable between an operative position allowing displacement of said releasing means from said starting position and an inoperative position blocking displacement of said releasing means from said starting position; and

operating means including an operating element connected to said clutch means and to said releasing means and displaceable from a normal position to an actuated position for simultaneous displacement of said cam followers into said engaged position and coupling of said releasing means to said pack.

4,077,342

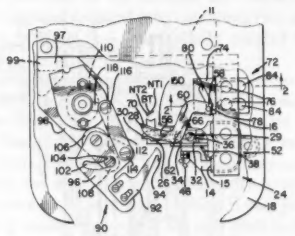
THREAD TRIMMING MECHANISM FOR SEWING MACHINES

Paul E. Steckenrider, Hoffman Estates, Ill., assignor to Union Special Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 640,982, Dec. 15, 1975, abandoned. This application Oct. 6, 1976, Ser. No. 729,925

Int. Cl.[2] D05B *65/02*

U.S. Cl. 112—292 **20 Claims**



1. An automatic sewing machine having a vertically reciprocating needle, a throat plate means, a rotary hook assembly means, a bobbin case journalled in said hook assembly means, finger means below the top of said bobbin case for restraining said case against rotation, and a thread trimming assembly means comprising:

a bobbin thread pull-off assembly means operative between the top of said bobbin case and said throat plate for removing a selected amount of thread from said bobbin case;

a thread cutter assembly means operative between said bobbin thread pull-off means and said throat plate means, said thread cutter assembly means including two moveable blades, means for interconnecting said blades for cooperative movement in unison whereby severing in a true scissor like manner both the bobbin and needle threads below said throat plate means; and

mounting means for pivotally mounting one of said blades and reciprocably mounting the other of said blades including means for adjusting the degree of movement imparted to one of said blades.

4,077,343

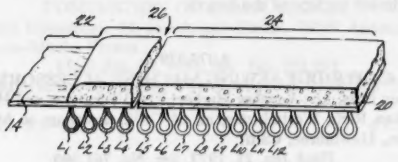
TUFTING METHOD OF REDUCING YARN WASTES DURING THE TUFTING PROCESS

James W. Hawkins, Calhoun, Ga., assignor to Wellco Carpet Corporation, Calhoun, Ga.

Filed May 14, 1976, Ser. No. 686,673

Int. Cl.[2] D05C *17/02*

U.S. Cl. 112—410 **9 Claims**



1. In a process for tufting carpets wherein a plurality of yarns are threaded to at least one vertically reciprocating needle bar provided with a plurality of needles, primary backing material is moved past the needle bar as the needle bar is reciprocated so as to form tuft loops thereby, and wherein the yarn is suitably retained in the backing material following each reciprocation of the needle bar, the improvement comprising the steps of: threading a predetermined number of the outer needles in the needle bar which produce the selvage portion of the carpet with a low cost yarn and threading the remaining needles in the needle bar between said predetermined outer needles with a first quality yarn wherein the first quality yarn is that yarn which is to appear in the finished carpet.

4. A new article of manufacture comprised of:

a layer of primary backing material having a predetermined length and width;

a plurality of rows of yarns retained within said primary backing material, said rows extending across a predetermined portion of the width of said primary backing material and along the length thereof;

wherein a predetermined number of the outer rows within said rows of yarns are comprised of waste yarn and the rows between said predetermined number of outer rows are comprised of non-waste yarn.

4,077,344

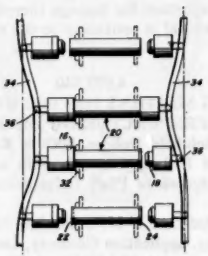
SYSTEM FOR BEADING AND FLANGING CAN BODIES

Wade D. Fletcher, Hartsville, and Robert A. Norwood, Darlington, both of S.C., assignors to Sonoco Products Company, Hartsville, S.C.

Filed Sep. 28, 1976, Ser. No. 727,339

Int. Cl.[2] B21D *43/00*

U.S. Cl. 113—115 **6 Claims**



1. An apparatus for the formation of the opposed ends of a tubular can body including a pocketing rotary carrier for receiving and moving a can body along a predetermined path through said apparatus, opposed first and second die chuck means mounted for forming movement into engagement with the opposed ends of a can body as the can body moves along a portion of the path through the apparatus, and means for

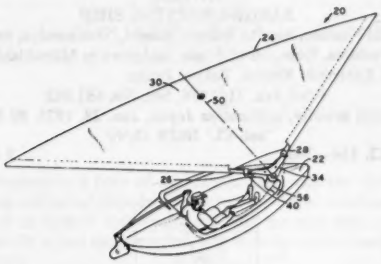
simultaneously moving said chuck means into engagement with said can ends; the improvements comprising means for sequentially moving said first chuck means out of engagement with the can body and then said second chuck means out of engagement with the can body, and stop means on a rigid with said carrier cooperating with the second chuck means, when engaged with the can body end, to engage and retain one end in engagement with the second chuck means as the first chuck means is moved out of engagement with the can body.

4,077,345

SAILBOAT CONSTRUCTION

Grey M. Gurley, 900 Tioga Dr., Apt. 204, Ventura, Calif. 93001

Filed Mar. 2, 1977, Ser. No. 773,401
Int. Cl.² B63H *9/08*
U.S. Cl. 114—39 **13 Claims**



1. A sailboat having a hull and a sail assembly, said sail assembly being connected to said hull by connecting means, the improvement comprising:

said sail assembly including a sail structure and a swivel means, said sail assembly including a mounting member, said swivel means cooperating with said connecting means to permit 360° movement of said sail structure relative to said hull, said swivel means moving about a single axis of rotation provided by an elongated rod rotationally mounted within an elongated tube in a close fitting manner, said elongated rod being attached to said mounting member, said hull having a longitudinal center axis which coincides with the direction of boat movement, said axis of rotation intersecting said longitudinal center axis at an acute angle;

said sail structure including a first elongated member and a second elongated member with a sail stretched therebetween when said sail is open, said axis of rotation when extended through the open said disects the sail into two substantially equal parts, said first and said second elongated members forming substantially a right angle when said sail is open, said first and said second elongated members being connected to said mounting member, at least one of said elongated members being movable in respect to said mounting member, whereby the one said elongated member may be moved directly adjacent the other said elongated member causing collapse of said sail, securing means connected to said one elongated member to secure the said one elongated member to said mounting member when said sail is open; and

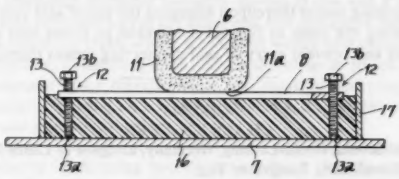
said mounting member including rotation retarding means, said rotation retarding means preventing freewheeling inertial movement of said rod in said tube, said rotation retarding means facilitating manual movement of said sail assembly to different angular positions in respect to said hull, said rotation retarding means including structure annularly located about said elongated rod.

4,077,346

METHOD OF PRODUCING STORAGE TANK SUPPORT BLOCK FOR LOW TEMPERATURE LIQUIFIED GAS CARRYING VESSELS

Takehiko Inoue; Junichi Tabata; Hidekatsu Ohishi, and Seiichiro Murata, all of Osaka, Japan, assignors to Hitachi Shipbuilding & Engineering Co., Ltd., Osaka, Japan

Filed Oct. 18, 1976, Ser. No. 733,074
Claims priority, application Japan, Oct. 20, 1975, 50/126594
Int. Cl.² B63B *25/08*
U.S. Cl. 114—74 A **12 Claims**



5. In a construction for slidably supporting a spherical low temperature liquified gas storage tank on a support deck in the hold of a ship, including a support ring provided on said spherical tank in the vicinity of its equator and a plurality of support legs projecting from the lower surface of the support ring at circumferentially spaced intervals, the improvement comprising:

supporting means carried by said support deck for slidably engaging said support legs;

said supporting means including a plurality of abutment plates, each of said abutment plates being slidably engageable by one of said support legs;

adjusting means for adjusting the height of each of said abutment plates relative to said support deck whereby the load of the storage tank is uniformly distributable on said supporting means;

a plurality of molding flasks, each of said molding flasks being welded to said support deck in surrounding relation with one of said abutment plates; and

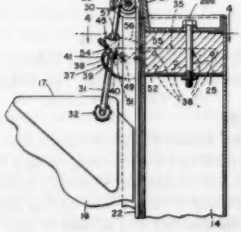
a pressure and low temperature resistant resin filling the space defined by said support deck, each of said molding flasks and each of said abutment plates and fixing said abutment plates in adjusted heat insulating relation to said support deck and relative to said support legs.

4,077,347

HALYARD LATCH APPARATUS FOR A SAILBOAT

Henry Leyva Arce, San Juan Capistrano, Calif., assignor to Coast Catamaran Corporation, Irvine, Calif.

Filed Jun. 23, 1977, Ser. No. 809,459
Int. Cl.² B63H *9/04*
U.S. Cl. 114—108 **4 Claims**



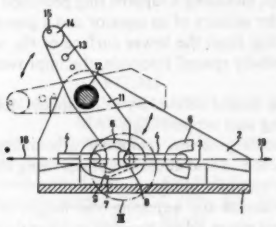
1. Apparatus for selectively latching and releasing a sail to a mast comprising: a pulley rotatably mounted to the mast; a line

routed over said pulley and extending downwardly therefrom; connecting means for connecting the distal end of said line to said sail; catch means secured to said mast at a location at which it is desired to secure said sail; and a pawl rotatably mounted adjacent said catch means and extending outwardly thereof; whereby said pawl is adapted to be engaged by said connecting means when said sail is raised and rotated from a first position to a second position exposing said catch means, said catch means adapted to engage said connecting means for latching the same, said connecting means being released from said catch means by the application of further tension on said line to move said connecting means above said pawl, said connecting means thereupon engaging the top of said pawl and lowering the same as the sail is lowered to cover said catch means and prevent entry of said connecting means thereupon.

4,077,348
CHAIN STOPPER

Anton Broehl, Brohl-Lutzing, Germany, assignor to Lebus International, Inc., Longview, Tex.

Filed Dec. 17, 1976, Ser. No. 751,811
Int. Cl.[2] B63B *21/18*
U.S. Cl. 114—200 **5 Claims**



1. A chain stopper for a round bar iron chain, particularly a ship's anchor chain, including:

two guideways for the horizontally oriented links of the chain, said two guideways including preformed detents thereon and being arranged parallel with respect to the longitudinal direction of the chain and incorporating therebetween a groove for guiding the vertically oriented links of the chain, and

at least one clamping lever mounted for pivotal movement about a horizontal pin above the chain and including pawl sections for locking the chain under pull, characterized by the fact that:

the two pawl sections are arranged side by side in parallel and between each other provide a vertical slit to remain free for the passage of the vertical links of the chain, and

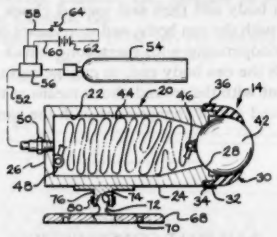
the pawl sections are of such a length that in the locking position they engage, in a locking manner, in the detents on the guideways for the horizontal links of the chain.

4,077,349
LINE BOY

William A. Paul, 1808 Parkside Blvd., Toledo, Ohio 43607

Filed Jun. 14, 1976, Ser. No. 695,658
Int. Cl.[2] B63B *21/00*
U.S. Cl. 114—230 **2 Claims**

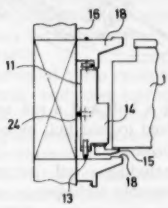
1. A propelling device for propelling a line from one location toward another, said device comprising a housing forming a cavity, a projectile, means for releasably holding said projectile at one end of said cavity, a line having one end affixed to said projectile and another end affixed to said housing, means for establishing a force within said cavity against said projectile to cause said projectile to be ejected from said housing along with said line, said force means comprising a spring within said cavity, said releasably holding means comprising mechanical means engaging said projectile, and remotely-controlled means for disengaging said mechanical means from said projectile.



4,077,350
BARGE-CARRYING SHIP

Yasushi Nishino, Akashi; Saburo Adachi, Nishinomiya, and Koji Karashima, Kobe, all of Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 21, 1976, Ser. No. 651,062
Claims priority, application Japan, Jan. 28, 1975, 50-11540
Int. Cl.[2] B63B *35/40*
U.S. Cl. 114—260 **9 Claims**



1. A barge carrying ship comprising a vessel having a deck for receiving barges, an open hold space for storing said barges and a hatch in said deck communicating with said hold, a first elevator at one end of said vessel for lifting and lowering a barge to and from said deck, rail means extending from said first elevator to said hatch, truck means adapted to travel on said rail means, each said truck means comprising a pair of independent and separate trucks located on said rail means relative to each side of the vessel, said trucks each having a separate support bracket extending laterally therefrom in a horizontally fixed position to engage and support said barge, and means for moving said barge and associated truck means to and from said first elevator and said hatch and a second elevator located in said hatch to lower and lift said barge and said associated truck means to and from said hold.

4,077,351
AMPHIBIOUS RECREATIONAL VEHICLE

Manuel Garcia Girona, 7 Montee de l'Eglise, Caluire (Rhone), France

Filed Jan. 19, 1976, Ser. No. 650,333
Claims priority, application France, Mar. 14, 1975, 75.08652
Int. Cl.[2] B63H *16/00*
U.S. Cl. 115—27 **4 Claims**

4. An amphibious tricycle, comprising:

a frame having an elongate front-to-rear main frame member,

a pedal drive, a handle bar, a saddle and a front fork, operatively mounted on said main frame member;

a buoyant front wheel rotatably mounted on said fork for angular steering movement;

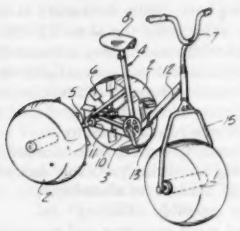
a U-shaped yoke member detachably secured to said main frame member;

a pair of bearing sleeves coaxially aligned along an axis transverse to the plane of said main frame member;

a rear axle assembly rotatably supported by said bearing sleeves,

said rear axle assembly including: a hollow cylinder having a length approximately equal to the distance between the inner ends of said bearing sleeves, a sprocket wheel mounted on said cylinder, a center axle extending through said bearing sleeves and said cylinder, said center axle having a longitudinal bore extending from each end thereof, each bore having a threaded socket at the end thereof;

a pair of stub axles, each stub axle having a reduced-diameter portion having a threaded free end and being slidably



received in a bore of said center axle with the threaded free end being threadably secured to a center axle's socket;

a pair of hollow stub shafts mounted on said stub axles, a paddle wheel radially extending from one end of each stub shaft;

a pair of buoyant rear wheels mounted on the other ends of said stub shafts;

a rudder coupled to the rear end of said main frame for pivotal movement about a vertical axis;

a pair of flexible steering cables extending in cross-relation between said front fork and said rudder to allow said rudder to rotate in a direction opposite from the direction of rotation of said front wheel thereby steering said tricycle; and

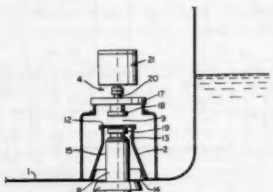
a chain mounted on said sprocket wheel for driving said tricycle.

4,077,352

VESSEL PROPULSION AND/OR STEERING MEANS

Anders Marius Liaaen, Alesund, Norway, assignor to A. M. Liaaen A/S, Alesund, Norway

Filed Jan. 18, 1977, Ser. No. 760,466
Claims priority, application Norway, Jan. 23, 1976, 760221
Int. Cl.² B63H *1/14*
U.S. Cl. 115—35 **7 Claims**



1. A vessel propulsion and steering device which is vertically mountable in an elongated, hollow, downwardly open sleeve located in the hull of the vessel, the hollow, downwardly open sleeve including an upper inner sealing surface, a lower inner sealing surface and a removable cover on the end thereof inside said vessel, the propulsion and steering device including

an elongated, hollow, cylindrical intermediate sleeve positionable within said hollow sleeve and including an upper outer sealing surface and a lower outer sealing surface, which surfaces are respectively engageable with said upper inner sealing surface and said lower inner sealing surface of said hollow, downwardly open sleeve;

an elongated propeller assembly having at one end a rotatable propeller and at the other end and elongated, hollow, cylindrical trunk which is mounted within said elongated, hollow, cylindrical intermediate sleeve so as to leave an annular space therebetween, said trunk of said propeller assembly being both axially movable and rotatable within said intermediate sleeve;

means positioned between said trunk and said intermediate sleeve for forming two variable volume chambers therebetween; and

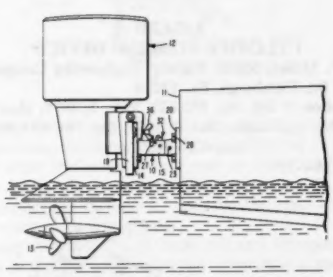
means for separately supplying pressure medium to either of said two chambers; such that when said intermediate sleeve and trunk is positioned generally within said hollow, downwardly open sleeve, pressure medium can be supplied to one of said two chambers to move said intermediate sleeve with its upper and lower outer sealing surfaces relatively to the upper and lower inner surfaces, respectively, of said hollow, downwardly open sleeve, whereas when pressure medium is supplied to the other of said chambers the trunk of said propeller assembly is moved relatively to said removable cover.

4,077,353

MOTOR MOUNT FOR A BOAT

Lewis W. Webb, Jr., 5232 Edgewater Dr., Norfolk, Va. 23508

Filed Dec. 29, 1976, Ser. No. 755,505
Int. Cl.² B63H *5/12*
U.S. Cl. 115—41 R **3 Claims**



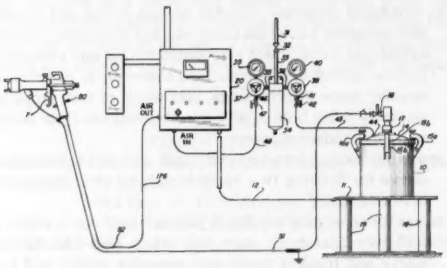
1. A device for mounting an outboard motor to a transom of a boat, said motor having an inverted U-shaped clamp for securing it to a support member, said device comprising a sleeve, a plate secured to a first end of the sleeve and having a cross-section larger than that of the sleeve, a second plate attached to the first plate and adapted to be clamped to the motor by said clamp, an annular flange secured to the second end of the sleeve, a plate member having a U-shaped opening open at its top and having a closed bottom conforming to the configuration and dimensions of the lower half of the said annular flange, said plate member having an extension around its edge which forms a slot, said annular flange being rotatably disposed in the slot to secure the sleeve to the plate member, means for securing the plate member to a transom of a boat, and means for locking the flange against rotation in the slot

when the motor is in an operable position and when the motor is rotated to a point out of the water.

4,077,354
FAST DISCHARGE ELECTROSTATIC COATING SYSTEM

Arvid C. Walberg, 708 S. Lombard Ave., Lombard, Ill. 60148

Filed Oct. 7, 1976, Ser. No. 730,308
Int. Cl.² B05C *11/00*
U.S. Cl. 118—12 **7 Claims**

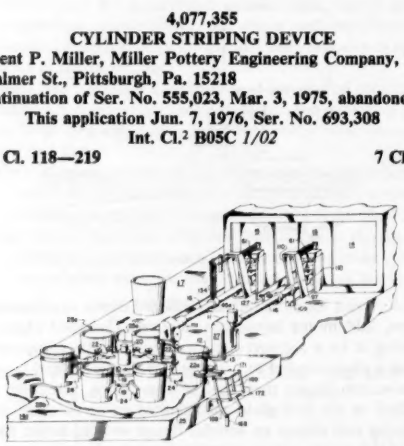


1. A coating system comprising:
a spray gun body for atomizing and ejecting coating material into the atmosphere having a forward end,
means for generating an alternating series of high voltage pulses at not less than a supersonic frequency,
means for rectifying said alternating series of direct current pulses into a series of single polarity high voltage pulses connected to said generating means and having an output of two terminals across which said series of pulses are provided as a high voltage direct current,
an electrical resistance connecting said terminals, and means applying an electrostatic field to the atomized coating material being ejected from said gun forward end connected to one said terminal, the other said terminal being connected to work to be coated.

4,077,355
CYLINDER STRIPING DEVICE

Vincent P. Miller, Miller Pottery Engineering Company, 2300 Palmer St., Pittsburgh, Pa. 15218

Continuation of Ser. No. 555,023, Mar. 3, 1975, abandoned.
This application Jun. 7, 1976, Ser. No. 693,308
Int. Cl.² B05C *1/02*
U.S. Cl. 118—219 **7 Claims**

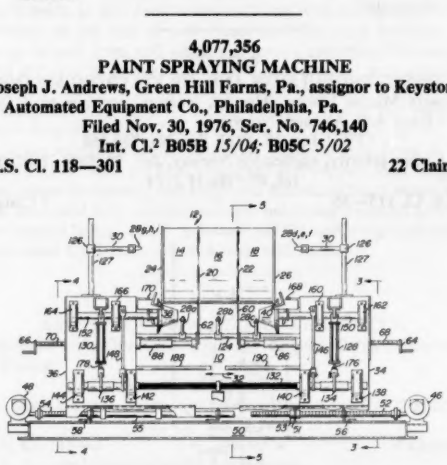


1. Apparatus of the type characterized by a stripe printing head mounted on the forward end of a tubular driving arm extending from, and pivotally supported by, a headmount generally remote from the printing head for applying circumferential stripes to the outside surface of cylindrical work pieces, said apparatus being constructed to operate on the work pieces with their cylindrical axes substantially vertical, comprising in combination
a printing head including
a housing,
a printing roller,
an applicator drum in operative contact with said printing roller and
a pocket-type pigment reservoir block enclosing and confining a reservoir of pigment adjacent a segment of said applicator drum,
said reservoir block being adjustably mounted on said housing to embrace said segment of said applicator drum on both sides and at both ends of said segment,
means in sealed connection with said reservoir block for filling the same,
applicator-drum drive gearing assembled within said housing.
a tubular driving arm rigidly connected at one end to said housing and supporting the same for movement of the printing head while maintaining the axes of said printing roller and applicator drum substantially vertical,
a drive shaft extending through said tubular driving arm into said housing and connected at its end therein to said drive gearing in driving relation thereto,
a headmount assembly remote from said printing head, said tubular driving arm being pivotably mounted in and supported by said headmount assembly,
said headmount assembly including
1. a universal pivot engaging and supporting the end of said tubular driving arm,
2. a forwardly extending yoke pivotally mounted at its base for angular adjustment about a generally horizontal axis in said headmount,
3. a driving-arm guide track on said yoke below said driving arm and forward of said universal pivot,
4. a driving-arm positioning lever fulcrumed on said headmount and resiliently connected to said driving arm forward of said universal pivot to move said driving arm aong said guide track,
said drive shaft extending through said tubular driving arm and beyond said headmount for connection to transmission shafts from a power source, and
means operable from behind said headmount to rotate said driving-arm positioning lever fulcrumed on said headmount.

4,077,356
PAINT SPRAYING MACHINE

Joseph J. Andrews, Green Hill Farms, Pa., assignor to Keystone Automated Equipment Co., Philadelphia, Pa.

Filed Nov. 30, 1976, Ser. No. 746,140
Int. Cl.² B05B *15/04*; B05C *5/02*
U.S. Cl. 118—301 **22 Claims**



1. A paint machine for painting an object, comprising:
(a) a pair of longitudinally displaceable housing means for positionally mounting said object on said paint machine in a predetermined location; each of said housing means having at least one individual and separate rotatable shaft

and connecting roller for rotatably driving said object about a longitudinally extending axis of said object,

(b) means for spraying paint on an outer surface of said object;

(c) each of said housing means having an individual means for delineating zones on said object surface for directing said sprayed paint from said spray paint means to a predetermined zone on said surface of said object;

(d) housing displacement means for longitudinally displacing said housing means each with respect to the other to accommodate differing sized objects; and

(e) means for ejecting said object from said positional mounting on said housing members subsequent to a painting operation.

4,077,357

APPARATUS FOR THE APPLICATION OF A PROTECTIVE COATING TO A GRAPHITE ELECTRODE

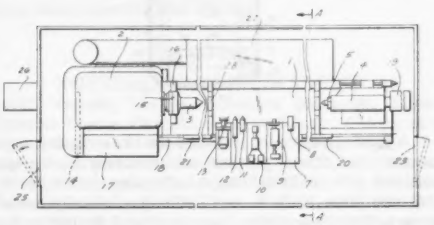
Vassil Georgiev Peev; Alexander Yordanov Valchev; Emil Pantaleev Ninov; Todor Yankov Koychev; Yordan Ivanov Krestenyakov; Hristo Nenchev Parashkevov; Avedis Mardik Dersarkisyan; Hristo Krumov Lyubenov; Borimir Nanov Nenov, and Ivan Vassilev Genev, all of Sofia, Bulgaria, assignors to DSO "Cherna Metalurgia", Botunetz, Bulgaria

Filed Feb. 4, 1976, Ser. No. 655,264

Claims priority, application Bulgaria, Feb. 12, 1975, 28955

Int. Cl.[2] B05B *13/04*

U.S. Cl. 118—321 **1 Claim**



1. An apparatus for applying a protective coating to an elongated electrode comprising:

an accoustic housing having walls, a door affording access to the interior by an operator, and a lid openable to permit the lowering of an electrode into said housing;

a support in said housing formed with horizontal parallel guideways;

a headstock fixed at one end of said support in said housing and being provided with a first spindle;

a tailstock disposed along said guideways and spaced from said support, said tailstock being formed with a second spindle, an electric motor, and a slip coupling between said electric motor and said second spindle for advancing said second spindle toward said first spindle and clamping an electrode therebetween with a predetermined clamping force;

a lead screw extending along said guideways;

gearing operatively connecting said first spindle to said lead screw for driving said lead screw at a speed in a predetermined ratio to the speed of said first spindle;

a constant-speed motor operatively connected to said first spindle for rotating same at a fixed speed;

a longitudinal slide on said guideways coupled with said lead screw for displacement thereby;

first, second, third, fourth and fifth cross-slides on said longitudinal slide operable independently of one another;

electrode cleaning means on said first cross-slide for cleaning an electrode supported on said spindles and preparing same to receive a coating;

electric-arc means on said second cross-slide for subjecting an electrode supported on said spindle to an electric-arc treatment;

metal-spray means on said third cross-slide for spraying molten metal on an electrode supported between said spindles;

coating-spray means on said fourth cross-slide for spraying a further coating material on an electrode supported between said spindles;

grinding means on said fifth cross-slide for grinding the surface of an electrode supported on said spindles; and

control means for operating said electric motor to clamp an electrode between said spindles, repeatedly displacing said longitudinal slide along said guideways in a forward and in a return direction while an electrode is clamped between said spindles, successively advancing said first, said second, said third, said fourth and said fifth cross-slide for respective operation during movement of said longitudinal slide in successive forward directions, and thereafter reversing said electric motor to unclamp an electrode from between said spindles.

4,077,358

DEACTIVATING DEVICE FOR A MAGNETIC BRUSH DEVELOPER USED IN A MULTICOLOR ELECTROPHOTOGRAPHIC COPYING MACHINE

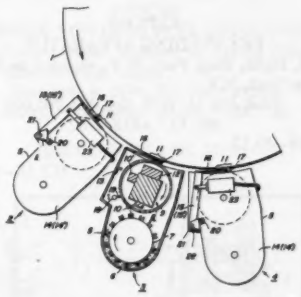
Hidetoshi Kito, Ebina, Japan, assignor to Rank Xerox Ltd., London, England

Filed May 3, 1977, Ser. No. 793,458

Claims priority, application Japan, May 17, 1976, 51-061357

Int. Cl.[2] G03G *15/09, 15/01*

U.S. Cl. 118—658 **2 Claims**



1. In a developing arrangement having at least two magnetic brush developing rolls, one of which is held in an inoperative condition while the other is operated to develop the latent image, the improvement comprising,

a control plate associated with each roll for removing developer material from said rolls,

a separator associated with each roll and interposable between its associated roll and the latent image, and

means for controlling the plate and separator of one of said rolls independently of the other whereby one roll may be rendered inoperative to develop said image independently of the other by concurrently adjusting its associated plate and separator.

4,077,359

STABLE STRUCTURE FOR CATTLE SELF-FEEDING AND OPEN AIR PEN CATTLE BREEDING

Aldo Amurri, Via Mantini, 1, Chieuti (Foggia), Italy

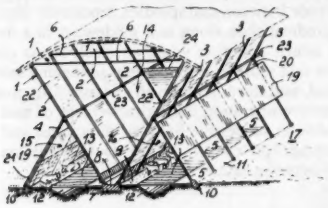
Filed Apr. 19, 1976, Ser. No. 678,507

Int. Cl.[2] A01K *1/00, 1/10*

U.S. Cl. 119—16 **5 Claims**

1. A stable structure for cattle self-feeding and breeding comprising a floor structure, a number of base blocks connected to said floor structure, a plurality of modular frames

arranged spaced apart in a consecutive relationship and walls between parts of said spaced frames, each of said frames comprising two pillars converging to each other in a V-like configuration, said pillars being secured to one of said base blocks at the vertex of said V-like configuration, one lateral strut at one side of each of said pillars for supporting thereof externally of said V-like configuration, said struts each extending in the plane of said pillars inclined with respect to said pillars and each having an upper end engaging a corresponding one of said pillars at an intermediate portion thereof and a lower end



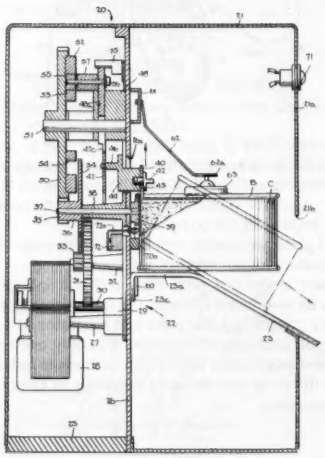
secured to a corresponding other of said base blocks in a position spaced away from said vertex of said V-like configuration, at least one tie rod connecting said pillars above said struts, means for connecting said frames including walls between parallel pillars, wherein said walls define a central hopper-like sheltered storage and gravity feed space and said struts define in cooperation with the facing pillar portions two lateral stable spaces, and means for cattle self-feeding arranged at the base of said converging pillars between said feed space and each of said two lateral stable spaces.

4,077,360

PET FEEDING APPARATUS

Anthony G. Figlia, Rego Park, N.Y., assignor to F. G. Waide, Inc., New York, N.Y.

Filed Jul. 16, 1976, Ser. No. 706,003
Int. Cl.[2] A01K *5/02*
U.S. Cl. 119—51.12 **12 Claims**



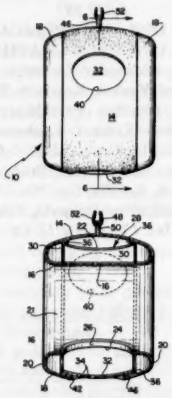
1. A pet feeding apparatus for use with hermetically sealed cans of pet food, comprising can opener means including a cutter blade mounted for reciprocal movement into and out of a cutting location, motor means for revolving a can to be opened when the same is disposed at said cutting location, timer means settable for a desired time interval at the end of which a pet is to be fed and operable to control said motor means so as to permit activation thereof only at the end of said time interval, power means operable conjointly with said motor means for sequentially reciprocally displacing said cutter blade so as to first force said cutter blade through the lid of said can concomitantly with the revolution thereof and, after the lid has been severed, then retract said cutter blade from said can to release the latter, and a ramp structure for supporting the opened can upon release thereof and guiding it to a receiving location at which it is accessible to the pet.

4,077,361

BIRD FEEDER

Erik R. Thorp, 50 Benson Ave., Rumford, R.I. 02916

Filed Jun. 1, 1976, Ser. No. 691,509
Int. Cl.[2] A01K *39/00*
U.S. Cl. 119—52 R **10 Claims**



1. A feeding device for birds and the like including separate container and closure portions, said container having spaced inner and outer walls defining a hollow interior for receipt of feed, said inner walls in part defining a laterally extending recess within the container, said inner wall further having an interior access feed opening therethrough to permit birds at least partially within said recess to gain access to seed within said container, the outer walls of said container having at least one interior access fill opening through which the container may be filled with seed, said closure being movable relative to said container to selectively open and close said fill opening, said closure including at least one opening therethrough and said container outer wall at least proximate said fill opening including means for receiving said closure in slidable contact therewith wherein the closure opening can be selectively aligned and misaligned with said outer wall fill opening to respectively open and close said fill opening, said means for receiving said closure including a recessed channel longitudinally orientated along the outer surface of said container, said channel having spaced downwardly orientated walls and a connecting bottom wall, said closure having a top surface adapted for generally flush positioning with respect to the outer container wall portions proximate said recessed channel.

4,077,362

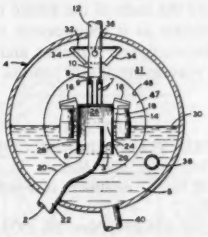
STEAM-WATER SEPARATOR ARRANGEMENT

Ronald James Hawkins, Morden, England, assignor to Babcock & Wilcox, Limited, London, Great Britain

Filed Sep. 13, 1976, Ser. No. 722,836
Int. Cl.[2] F22B *37/26;* **B01D** *45/12*
U.S. Cl. 122—491 **5 Claims**

1. A drum including wall means defining an upper vapor space and a lower liquid space, means for supplying a vapor-liquid mixture of the drum, vapor-liquid separating means disposed within the drum and having a vapor outlet communicating with the vapor space and a liquid outlet communicating

with the liquid space, the separating means being mounted on a duct extending centrally of the drum, the duct having an open bottom immersed in the liquid space, the liquid surface level externally of the duct being higher than the liquid surface level within the duct due to pressure loss through the separating means, the duct being sized to insure that the vertical distance between the open bottom and the liquid surface level externally of the duct is greater than the difference in liquid



surface levels resulting from the maximum pressure loss through the separating means, conduit means connected to the vapor-liquid supply means, the conduit means extending through the open bottom to discharge the vapor-liquid mixture at a location above the liquid surface level within the duct, at least one opening extending through the drum wall means, the opening being sized to allow removal therethrough of the duct with the separating means mounted thereon, and a detachable closure means covering said opening.

4,077,363

INTERNAL COMBUSTION ENGINE

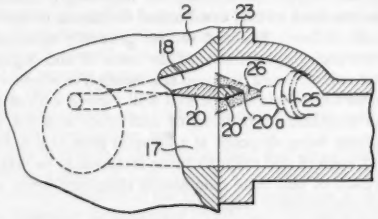
Masaaki Noguchi, Nagoya; Masaharu Sumiyoshi, Toyota; Yukiyasu Tanaka, Okazaki, and Taro Tanaka, Chiryu, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Continuation-in-part of Ser. No. 445,785, Feb. 25, 1974, Pat. No. 3,982,504. This application Jul. 29, 1975, Ser. No. 600,113

Claims priority, application Japan, Feb. 27, 1973, 48-23926; Nov. 6, 1973, 48-124663; Nov. 13, 1973, 48-127952; Jul. 30, 1974, 49-87807

Int. Cl.² F02B *19/10;* **F02M** *13/06;* **F02B** *19/18*

U.S. Cl. 123—32 SP **9 Claims**



1. In a internal combustion engine including at least one cylinder, a piston in said cylinder, a cylinder head cooperating with said piston and cylinder to define a combustion chamber, means defining therein a trap chamber adjacent to said combustion chamber, a primary intake port for introducing a lean air-fuel mixture into said combustion chamber, a secondary intake port for supplying a rich air-fuel mixture to said trap chamber, means for producing said air-fuel mixtures, an intake valve having a valve stem and a valve head disposed downstream of said primary intake port, said trap chamber defining means further defining therein at least one suction passage means and at least one discharge passage means, said suction passage means being so operatively associated with said secondary intake port that said rich air-fuel mixture is received from said secondary intake port through said suction passage means into said trap chamber on an intake stroke of said engine, said combustion chamber being in communication with said trap chamber at least through said discharge passage means, a spark plug having a set of electrodes disposed in said trap chamber, said trap chamber defining means, said set of electrodes and said suction and discharge passage means being arranged such that a substantial part of said rich mixture introduced into said trap chamber is retained therein around said set of electrodes during the compression process of said engine, said spark plug being operative to ignite the rich mixture in said trap chamber to produce a torch jet which spurts at least through said discharge passage means into said combustion chamber to burn the lean mixture therein, said trap chamber defining means further having thereon a partition disposed between said suction and discharge passage means and extending into said trap chamber to partially divide the same so that a continuous path is formed in said trap chamber, said path interconnecting said suction and discharge passages, said set of electrodes being disposed in said path, whereby a fresh rich air-fuel mixture sucked into said trap chamber on the intake stroke of said engine forces out residual gases produced during the combustion process of said engine to effectively scavenge said trap chamber, wherein the improvement comprises wall means separating said primary and secondary intake ports which merge at their upstream ends into a single general passage and wherein said air-fuel mixture producing means comprises a single fuel injection nozzle provided in said general passage and so positioned as to inject the fuel toward the upstream end of said wall means whereby the injected fuel is divided and distributed by said separating wall means into said primary and secondary intake ports.

4,077,364

ELECTRONIC CONTROL FUEL SUPPLY SYSTEM

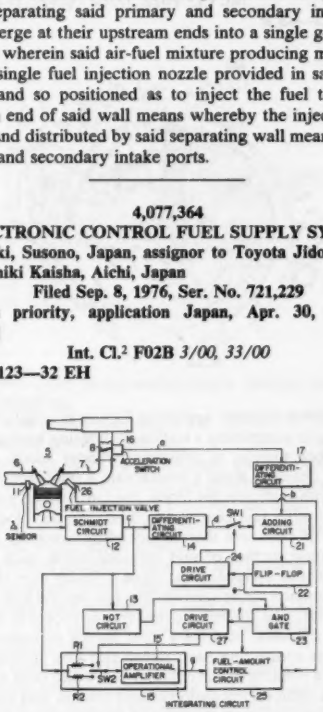
Keiji Aoki, Susono, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Sep. 8, 1976, Ser. No. 721,229

Claims priority, application Japan, Apr. 30, 1976, 51-53280[U]

Int. Cl.² F02B *3/00, 33/00*

U.S. Cl. 123—32 EH **8 Claims**



1. An electronic fuel supply system for use in an internal combustion engine having intake and exhaust systems comprising:

air-fuel ratio sensing means located in the exhaust system of said internal combustion engine for providing an output signal corresponding to the ratio of air to fuel being supplied to said engine;

an integrating circuit having first and second time constant values coupled to the output of said air-fuel ratio sensing means, said first time value being greater than said second time constant value;

acceleration switch means located in the intake system of said engine for detecting variations in the vacuum level of the intake air, said switch means having a first position

when said engine is not being accelerated and a second position after the start of acceleration;

control means coupling said air-fuel ratio sensing means and said acceleration switch means to said integrating circuit, said control means switching the time constant of said integrating circuit from said first value to said second value when said acceleration switch means is in said second position and when the output signal from said air-fuel ratio sensing means indicates that the air-fuel ratio of the mixture being supplied to said engine is greater than a predetermined ratio; and

fuel injection means located in the intake system of said engine coupled to the output of said integrating circuit, said fuel injection means injecting fuel into the intake system of said engine for a duration determined by the output of said integrating circuit.

4,077,365

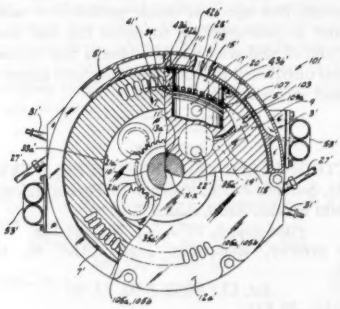
EXPANSIBLE CHAMBER APPARATUS

James B. Schlueter, Box 1, Breese, Ill. 62230

Division of Ser. No. 602,220, Aug. 6, 1975, abandoned. This application Aug. 13, 1976, Ser. No. 714,008

Int. Cl.² F02B *57/06*

U.S. Cl. 123—43 R **5 Claims**



1. Expansible chamber apparatus for use as an internal-combustion engine comprising a stationary housing having a cylindric chamber therein, a cylindric cylinder block rotatable within said chamber about a central axis, a shaft secured to and rotatable with said cylinder block, the longitudinal axis of said shaft constituting said central axis, said cylinder block having a plurality of cylinders therein extending inwardly from the outer cylindric surface of said cylinder block, each cylinder having a central cylinder axis, these cylinder axes being tangent to a common circle surrounding said central axis, a plurality of pistons, one for each cylinder, reciprocable within its respective cylinder, stationary gear means surrounding said shaft, means connecting each piston and said stationary gear for effecting rotation of the cylinder block and shaft about said central axis upon reciprocation of said pistons, said connecting means for each piston comprising a pinion gear in mesh with said stationary gear means and a connecting link pivotally secured to its respective piston and pivotally secured to its respective pinion gear offset from the center thereof so that upon reciprocation of said pistons said pinion gears are driven around said stationary gear means thereby to effect rotation of said cylinder block, and air intake means, fuel ignition means and exhaust means spaced at intervals around said housing for delivery of air and fuel for each cylinder, ignition of the resulting air-fuel mixture in each cylinder and exhaust of the products of combustion as the cylinder block rotates within said housing, each said pinion gear being so structured in relation to said ring gear that each piston moves through a power phase, an exhaust phase, an intake phase and a compression phase during each revolution of its respective pinion gear, said housing comprising a cylindric wall having said cylindric chamber therewithin, and a pair of covers, one for each end of said cylindric wall, for closing said cylindric chamber, and said air intake means comprising manifold means within said rotating cylinder block surrounding each said cylinder, a plurality of openings in said cover plates, passages in said rotating cylinder block providing communication between said openings and said manifold means, and a plurality of openings in said cylinder block providing communication between said manifold means and said cylinder, these last said openings being positioned intermediate the ends of the stroke undergone by said piston in said cylinder as it reciprocates to open and close communication between said cylinder and said manifold in timed relation to movement of said piston.

4,077,366

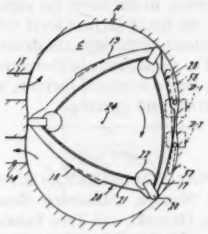
INTERNAL COMBUSTION ENGINE CONTROL SYSTEM

Laszlo Hideg, Dearborn, and Robert P. Ernest, Dearborn Heights, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Division of Ser. No. 636,184, Nov. 28, 1975. This application May 26, 1976, Ser. No. 690,116

Int. Cl.² F02B *53/02, 53/10*

U.S. Cl. 123—203 **2 Claims**



1. In an Otto cycle internal combustion engine of the rotary epitrochoid type having a plurality of variable volume main combustion chambers each aligned when in full compression with the minor axis of said epitrochoid thereby dividing each combustion chamber into leading and trailing portions with respect to the rotation of the engine, a prechamber ignition system, said engine have means for inducting a combustible mixture into each of said combustion chambers, comprising:

a. walls defining first and second generally spherical volumes each disposed outside the rotor of said engine, said first volume being disposed at a location in advance of the minor axis of said epitrochoid wall viewed with respect to the direction of rotation of said rotor and the second volume being disposed at a location after said minor axis and, each of said volumes being arranged to be juxtaposed in each of said main combustion chambers when in their full compression condition,

b. walls defining first and second passages connecting separately each of said generally spherical volumes with each of said main combustion chambers when disposed in their full compression condition, the first passage being aligned with the center of said first volume and oriented to direct a torch into each of said main combustion chambers counter to the rotation of said rotor, the second passage being aligned with the center of said second volume and oriented to direct a torch into each of said main combustion chambers in the same direction as the rotation of said rotor,

c. walls defining an introduction port to said generally spherical volumes through which is supplied a predetermined gaseous mixture, and

d. spark ignition means arranged to selectively apply a spark substantially adjacent the center of each of said volumes for promoting a torch from each said passages.

4,077,367

METHOD AND APPARATUS FOR OPERATING AN INTERNAL COMBUSTION ENGINE WITH SOLID FUEL

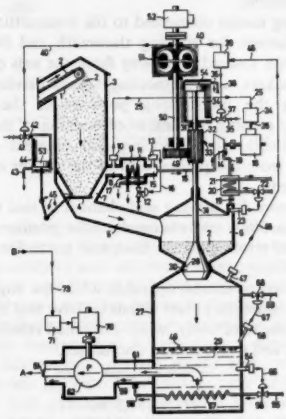
Anton Steiger, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Aug. 18, 1976, Ser. No. 715,500

Claims priority, application Switzerland, Jun. 11, 1976, 7390/76

Int. Cl.[2] F02B *19/04*

U.S. Cl. 123—23 23 Claims



1. A method for operating an internal combustion engine having fuel receiving cylinders with solid particulate fuel, said method comprising the steps of

intermittently feeding batches of the solid fuel particles to a first process station;

supplying a flow of hot dry gas to said first process station to dry the fuel particles in said first process station;

thereafter feeding the dried fuel particles to a second process station;

heating the fuel particles in said second process station to an elevated intermediate temperature to liquify the fuel particles into a highly viscous pumpable liquid while maintaining the liquified fuel in a gaseous atmosphere chemically inert to the liquified fuel and at a pressure at least equal to the pressure in said first process stage;

delivering the liquified fuel from said second process stage to a third process stage;

heating the liquified fuel in said third process stage at an elevated pressure to a higher temperature than said intermediate temperature; and

thereafter delivering the hot liquified fuel from said third process station at said higher temperature to the fuel receiving cylinders of the internal combustion engine.

9. An apparatus for operating an internal combustion engine having fuel receiving cylinders with solid particulate fuel, said apparatus comprising

a storage bin for solid particulate fuel;

a closing means connected to said bin for discharging batches of fuel particles therefrom;

a reaction vessel for receiving the batches of fuel particles from said bin;

first means connected to said reaction vessel for maintaining a dry hot gas atmosphere in said reaction vessel;

a melting tank for receiving dried fuel particles from said reaction vessel;

a control means between said reaction vessel and said melting tank to control the amount of fuel particles delivered from said reaction vessel to said melting tank;

a first heating means for heating the fuel particles in said melting tank;

means for supplying inert gas into said melting tank;

a pump connected to said melting tank to pump liquified fuel therefrom under pressure;

a heater connected to said pump to receive the pumped liquified fuel;

a second heating means for heating the fuel in said heater; and

conveying means connected to said heater to deliver the hot fuel from said heater to the cylinders of an internal combustion engine.

4,077,368

FOUR-CYCLE RECIPROCATING-PISTON INTERNAL COMBUSTION ENGINE

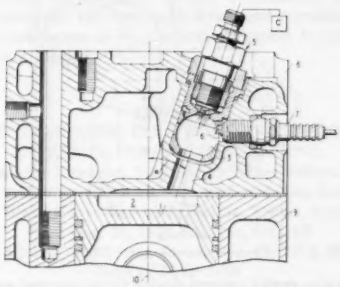
Jörg Abthoff, Pluderhausen; Günther Bubeck, Schorndorf; Roland Fink, Asperg; Ludwig Fricker, Stuttgart; Karlheinz Gube, Waiblingen; Jürgen Lammer, Korb; Hans-Dieter Schuster, Schorndorf, and Hans-Joachim Sponagel, Stuttgart, all of Germany, assignors to Daimler-Benz Aktiengesellschaft, Stuttgart, Germany

Filed Mar. 2, 1976, Ser. No. 663,047

Claims priority, application Germany, Mar. 8, 1975, 2510176

Int. Cl.[2] F02B *19/12, 19/18*

U.S. Cl. 123—32 ST 18 Claims



1. A four-cycle reciprocating-piston internal combustion engine comprising:

a main combustion chamber,

an unflushed ignition chamber,

a spill port communicating said main and ignition chambers with one another such that the combined volumes of the ignition chamber, the spill port, and the main combustion chamber in its most compressed condition together form the total compression volume.

a fuel injection nozzle opening into said ignition chamber for supplying fuel to said ignition chamber,

and a spark plug arranged at said ignition chamber at an angle to said injection nozzle for igniting fuel and air in said ignition chamber,

wherein the ratio of the volume of the ignition chamber to said total compression volume is in the range of 0.10 to 0.30 and the ratio of the volume of the spill port to the total compression volume is in the range of 0.01 to 0.25,

wherein the ratio of the diameter of the spill port to the diameter of a reference ignition chamber of a spherical shape is in the range of between 0.3 and 0.7,

wherein a movable piston is provided which bounds the main combustion chamber,

wherein injection means are provided for injecting fuel through said fuel injection nozzle,

wherein said injection means includes means for injecting between 2 and 10% of the maximum full-load quantity of fuel supplied to said combustion chamber and ignition chamber during operation of said engine into said ignition chamber, said injection means including means for supplying the remaining quantity of fuel to the main combustion chamber, and

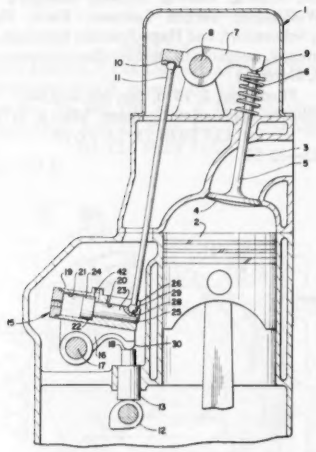
wherein injection control means are provided for initiating injection of fuel into said ignition chamber during the intake stroke movement of the piston bounding the main combustion chamber.

4,077,369

INTERNAL COMBUSTION ENGINE VALVE STROKE ADJUSTING DEVICE AND COMBINATION THEREOF WITH ENGINE

Joseph F. Buehner, Wadsworth, Ohio, assignor to Joseph F. Buehner, Trustee, Wadsworth, Ohio

Filed Apr. 21, 1976, Ser. No. 679,004
Int. Cl.[2] F01L 1/34
U.S. Cl. 123—90.16 **12 Claims**



1. A valve stroke control device for an internal combustion engine having a valve, a timing gear train, a rotatable cam driven by the train, transmission means driven by the cam from a starting closed valve position in one direction in which one direction the transmission means transmits thrusts of the cam so as to open the valve, and movable in an opposite direction in which the transmission means returns to starting position so as to permit closing of the valve; and spring means for returning the valve from open to closed position and the transmission means from open valve position to its said starting position;

said transmission means including a stroke control device comprising:

a first rocker;

first pivot means adapted for pivotally connecting the first rocker to the engine for rocking about a pivotal axis fixed in relation to the engine;

said first rocker having a thrust portion spaced a fixed distance from said pivotal axis and through which the driving forces of the cam can be applied to the first rocker for rocking the first rocker about its said pivotal axis in a valve opening direction in timed coordination with the rotation of the cam, and having a transmitting portion spaced from said thrust portion;

a second rocker for moving the valve to open position and for controlling its return;

second pivot means adapted for pivotally connecting the second rocker to the engine for rocking about a pivotal axis fixed in relation to the engine and spaced from said first pivotal axis;

said second rocker having a transmitting portion spaced from its said pivotal axis and through which the driving force of the cam can be transmitted from the first rocker when the first rocker is rocked in its valve opening direction, and having a valve operating portion spaced from its said transmitting portion;

stroke adjusting means including a movable element mounted on one of said rockers for rocking therewith and for movement in directions generally transversely of the pivotal axis thereof, one of which directions is from a normal stroke position spaced a predetermined distance from said pivotal axis of said one rocker to a changed stroke position which is spaced from said last mentioned axis a different distance than said predetermined distance, and the other of which directions is from said changed position to said normal stroke position;

the transmitting portion of said one of said rockers being on said element;

connecting means connected to the transmitting portion on said element for rocking therewith and for movement therewith toward and away from the axis of said one of said rockers, said connecting means drivingly interconnecting the transmitting portions of the rockers for thereby causing the degree of opening of the valve to be controllable by positioning said element different distances from the pivotal axis of the rocker on which it is mounted;

power means for driving said element to said normal stroke position from said changed stroke position, and to said changed stroke position from said normal stroke position, respectively; and

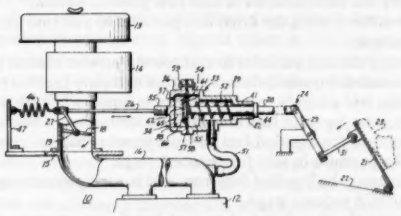
remote control means, operable while the engine is operating, to cause the power means to drive said element to said positions, selectively, while the timed relation of the first rocker and cam remains unchanged.

4,077,370

INTERNAL COMBUSTION ENGINE FUEL ECONOMY IMPROVEMENT SYSTEM

Harold E. Spangenberg, 7346 Via Amorita, Downey, Calif. 90241

Filed Aug. 19, 1975, Ser. No. 606,042
Int. Cl.[2] F02B 11/08
U.S. Cl. 123—103 B **41 Claims**



1. A method of assisting the driver of an automobile driven by a drive system including an internal combustion engine to improve fuel economy, said internal combustion engine drive system having an air intake manifold, a throttle valve, an accelerator pedal and a linkage coupling the accelerator pedal to the throttle valve, comprising in combination the steps of:

biasing the effective length of said linkage between said accelerator pedal and said throttle valve to an extreme value at which said throttle valve is in a closed position when said engine is deactivated;

determining the existence and intensity of a vacuum in said air intake manifold;

maintaining the effective length of said linkage biased at said extreme value at vacuum intensities up to a vacuum intensity existing in said air intake manifold at an idling rate of rotation of said internal combustion engine;

varying the effective length of said linkage so as to actuate said throttle valve toward a closing position in response to vacuum intensities above said vacuum intensity existing at said idling rate of rotation; and

inhibiting surges in the operation of said engine by stopping the effective length of said linkage at said extreme value at

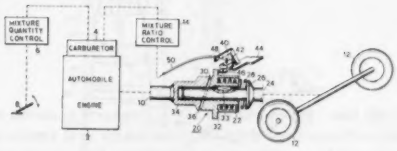
vacuum intensities occurring upon actuation of said accelerator pedal and being below said vacuum intensity existing at said idling rate of rotation.

4,077,371

FUEL SAVING SYSTEM FOR AUTOMOBILES

Mordeki Drori, 89 Zahal Street, Kiron, Israel

Filed Feb. 17, 1976, Ser. No. 658,609
Claims priority, application Israel, Mar. 27, 1975, 46720
Int. Cl.[2] F02D *13/02*
U.S. Cl. 123—106 7 Claims



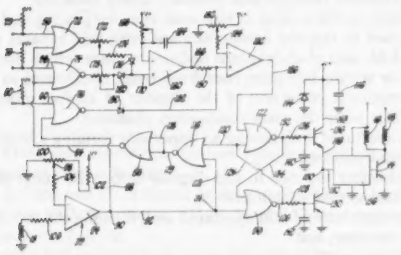
1. A fuel control system for automobile engines including a carburetor for forming an air-fuel mixture and means for controlling the quantity of said mixture to be supplied to the automobile engine in accordance with the power demanded to be supplied thereby to a member driven by the engine, characterized in that the fuel control system includes load-sensor means for sensing the load applied by the driven member on the engine; and mixture-ratio-control means responsive to said load-sensor means to control the mixture-ratio such as to produce a richer fuel mixture with increased loads and a leaner fuel mixture with decreased loads.

4,077,372

SPARK TIMING CONTROL SYSTEM FOR AN INTERNAL COMBUSTION ENGINE

Robert I. Masta, Ann Arbor, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jan. 24, 1977, Ser. No. 761,694
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—117 D 8 Claims



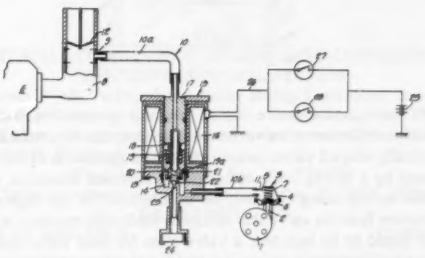
1. A spark timing system for an internal combustion engine comprising, at least one spark electrode for igniting the combustible mixture of said engine, means responsive to a spark firing control signal for causing spark firing energy to be applied to said spark electrode device, means driven by the crankshaft of said engine for generating a crankshaft position voltage which represents engine crankshaft position, engine speed advance means responsive to engine speed for phase shifting said crankshaft position voltage in the spark advance direction as a function of increasing engine speed, vacuum advance means responsive to engine manifold vacuum for phase shifting said crankshaft position voltage in the spark advance direction with increasing manifold vacuum, said engine speed and vacuum advance means jointly providing continuously variable spark advance functions which under some conditions are more advanced than desirable for certain conditions of engine operation and under all conditions providing the maximum spark advance for said system, spark timing control means for causing firing of said spark electrode device either at substantially the time of occurrence of a predetermined voltage transition of said crankshaft position voltage as determined by said engine speed and vacuum advance means or at either of at least first or second spark retards corresponding respectively to predetermined timing value that are retarded by predetermined crankshaft angles of rotation from the occurrence of said voltage transition, said spark timing control means comprising bidirectional ramp voltage generating means, an electronic spark selection logic network responsive to a binary input voltage having an output coupled to said spark timing control means for determining the spark timing mode of operation, and a plurality of engine condition responsive sensors each sensing a respective engine operating condition and each coupled to the input of said spark selection logic network to provide respective bits of binary input voltage thereto, the bit voltage provided by each sensor being a function of whether a respective engine operating condition is above or below a predetermined magnitude, said spark selection logic network and engine condition responsive sensors being so arranged that the simultaneous occurrence of a first predetermined combination of engine sensor outputs causes said spark timing to be controlled by said crankshaft position voltage, operative during a second combination of sensor outputs to provide said first spark retard and operative during a third combination of engine sensor outputs to cause said second spark retard.

4,077,373

IGNITION TIMING CONTROL DEVICE FOR AN INTERNAL COMBUSTION ENGINE

Soichi Nakano, Kawagoe; Yohji Ishii; Tetsuo Sekiya, both of Fujimi, and Akira Fujimura, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 10, 1974, Ser. No. 531,313
Claims priority, application Japan, Dec. 11, 1973, 48-137358
Int. Cl.[2] F02P *5/04*
U.S. Cl. 123—117 A 4 Claims



1. In an internal combustion engine having an intake manifold, an intake passage leading to said intake manifold, a throttle valve in said passage, a spark ignition timing control device, and distributor means having an adjustable ignition point, said timing control device being positioned between said intake passage and said distributor means, the improvement comprising, in combination: an ignition timing control member, bias means acting to move said control member in a direction to advance the ignition timing of said distributor means, a vacuum controlled servomechanism connected to said control member to oppose the force of the bias means, said servomechanism including a vacuum chamber, a vacuum port in said intake passage located downstream from the throttle valve at all throttle valve positions, a conduit for connecting said vacuum port to said vacuum chamber, whereby said ignition timing control member is caused to move toward ignition retard position as the vacuum pressure in said intake manifold and the vacuum chamber increases, and a control valve assembly in

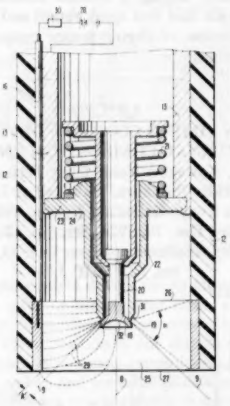
said conduit for de-activating said vacuum controlled servomechanism when the engine temperature is below a predetermined value, said control valve assembly comprising two switches connected in parallel and a solenoid valve which acts to close the conduit and de-activate the servomechanism upon closing of either of said two switches connected in parallel, one switch closing when the engine temperature is below a predetermined value, and the other switch closing when the engine speed exceeds a predetermined value.

4,077,374

INJECTION VALVE FOR INTERNAL COMBUSTION ENGINES

Karl Willmann, Buchenbach, and Helmut Säufferer, Esslingen, both of Germany, assignors to Daimler-Benz Aktiengesellschaft, Germany

Filed Apr. 16, 1976, Ser. No. 677,863
Claims priority, application Germany, Apr. 22, 1975, 2517682
Int. Cl.² F02M *47/00*; B05B *5/00*
U.S. Cl. 123—119 E **29 Claims**



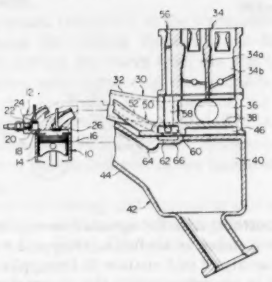
1. An injection valve for an internal combustion engine, which comprises a valve housing means, an approximately conically shaped valve means prestressed against its valve seat means by a spring force opposite the injection direction, said valve means being operably to be lifted off in the injection direction from its valve seat means by hydraulic pressure in the fuel liquid to be injected, a valve stem for said valve means, and a valve opening means, the fuel liquid being operable to be sprayed off from the valve opening means in the form of a spray cone by reason of a valve closure gap in the shape approximately of a truncated cone, characterized in that the valve seat means is arranged at the end of an electrically conductive tubular member, said tubular member being electrically conductively connected with the valve housing means and being considerably smaller in its outer diameter than a characteristic valve housing dimension within the area of the connecting place of the tubular member with the valve housing means, and in that an annular electrode means electrically insulated with respect to the valve housing means and with respect to the tubular member is arranged at a distance about the discharge place of the valve, said annular electrode means having a first end edge—as viewed in the direction of the spray cone and in the injection direction—which has a larger distance with respect to the valve housing means than with respect to the tubular member and a second end edge which is located outside of the spray cone.

4,077,375

FUEL VAPORIZER

Katuichi Ishikawa, Musashi-murayama; Yuji Sakakibara, Koganei; Hiraki Sawada, Seki, and Kizuku Otsubo, Kokubunji, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Mar. 15, 1976, Ser. No. 666,681
Claims priority, application Japan, Mar. 17, 1975, 50-31082
Int. Cl.² F02M *31/00*
U.S. Cl. 123—122 AB **4 Claims**



1. An intake and exhaust manifold system for an internal combustion engine of the type having an auxiliary combustion chamber associated with each main combustion chamber and connected by a torch passage comprising:

a main intake manifold in communication with the main combustion chamber and having a main riser with a bottom;

an auxilary intake manifold in communication with the auxiliary combustion chamber and having an auxiliary riser;

an exhaust manifold in communication with the main combustion chamber;

a first carburetor supported by said main riser for supplying a lean mixture to the main combustion chamber through said main intake manifold;

a second carburetor supported by said auxiliary riser for supplying a rich mixture to the auxiliary combustion chamber through said auxiliary intake manifold;

means on the bottom of said main riser for placing said main riser in thermal communication with said exhaust manifold, said placing means defining a space which prevents air within said main riser from being overheated so as to minimize reduction of the number of air-fuel molecules that enter the main combustion chamber;

an apertured wall having an upper side forming a bottom of said auxiliary riser;

a chamber exposed to and directly below the under side of said second carburetor;

the underside of said apertured wall forming the top of said chamber; and

a heater wall having an upper side forming the bottom of said chamber to receive the drops of fuel from said second carburetor, the under side of said heater wall being exposed to the exhaust gases in said exhaust manifold.

4,077,376

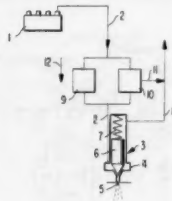
INJECTION INSTALLATION FOR DIESEL INTERNAL COMBUSTION ENGINE

Frank Thoma, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

Filed Apr. 14, 1975, Ser. No. 567,944
Claims priority, application Germany, Apr. 20, 1974, 2419159
Int. Cl.² F02M *55/00*
U.S. Cl. 123—139 DP **28 Claims**

1. An injection installation for a Diesel internal combustion engine which comprises an injection pump, injection valve means with valve needle means opening inwardly against a pressure of a spring means, injection lines communicating the

injection pump with the injection valve means for delivering fuel from the injection pump to the injection valve means, and leakage oil line means extending from and in communication with the injection valve means, characterized in that an installation including a flow-direction sensor means and a discharge



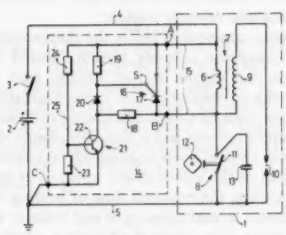
valve means is arranged in each injection line, said discharge valve means is in communication with the respective leakage oil line means and conducts a pump volume of the injection valve means resulting at the end of the injection operation into the respective leakage oil line means.

4,077,377

PROTECTIVE CIRCUIT FOR THE IGNITION SYSTEM OF AN INTERNAL COMBUSTION ENGINE

Werner Jundt, Ludwigsburg; Bernd Bodig, Leinfelden; Helmut Roth, Stuttgart; Gerhard Söhner, Remshalden, and Peter Werner, Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sep. 21, 1976, Ser. No. 725,163
Claims priority, application Germany, Sep. 25, 1975, 2542776
Int. Cl.[2] F02P 1/00
U.S. Cl. 123—148 S **10 Claims**



1. Protective circuit for ignition system (1) of an internal combustion engine having

an ignition coil (7), a master ignition switch (3) connected in series with the primary (6) of the coil (7) and a source of current (2, 4, 5);

a controlled switch (8) in series with the primary of the coil (7) which, upon closing thereof, and the master switch (3) being closed, permits current flow through the primary of the coil to store energy therein and, upon opening of the controlled switch, provides an inductive voltage pulse to the secondary (9) of the coil (7) to generate an ignition spark,

and comprising, in accordance with the invention,

a protective circuit branch (14, 15) connected in parallel to the primary (6) of the ignition coil (7) to prevent generation of an inductive sparking pulse due to inductive current when the controlled switch (8) is closed and the master ignition switch (3) is opened, including

a controlled auxiliary semiconductor short-circuiting switch (16) connected in parallel across the primary (6) of the ignition coil and in normally open condition to shortcircuit the inductive current, when controlled to close,

and auxiliary control circuit means (18, 19, 21) sensing

a. closed condition of the controlled switch (8) and

b. opening of the master ignition switch (3)

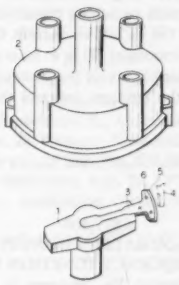
and then providing a control output pulse, said control output pulse being applied to and controlling the auxiliary semiconductor short-circuiting switch (16) to close, and thus short-circuit the inductive current from the ignition coil (7).

4,077,378

DISTRIBUTOR WITH NOISE SUPPRESSING DEVICE

Nozomu Okumura, Nagoya, Japan, assignor to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 19, 1975, Ser. No. 642,447
Claims priority, application Japan, Mar. 28, 1975, 50-37495
Int. Cl.[2] F02P 1/10
U.S. Cl. 123—148 P **10 Claims**



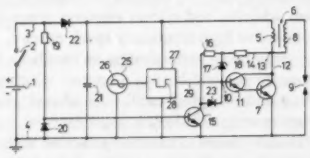
1. A distributor with noise suppressing device having a pair of electrodes which comprises a rotor electrode fixed on a rotor and a side electrode built in a cap of the distributor, wherein said pair of electrodes have a thin metal member which extends from one electrode to the other and in the rotational direction of said rotor electrode for suppressing the generation of radio noise.

4,077,379

INTERNAL COMBUSTION ENGINE SEMI-CONDUCTOR IGNITION CONTROL SYSTEM

Werner Jundt, Ludwigsburg; Bernd Bodig, Leinfelden; Helmut Roth, Stuttgart; Gerhard Sohner, Remshalden, and Peter Werner, Stuttgart, all of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Sep. 20, 1976, Ser. No. 724,976
Claims priority, application Germany, Sep. 25, 1975, 2542677
Int. Cl.[2] F02P 1/00
U.S. Cl. 123—148 S **17 Claims**



1. Semiconductor controlled ignition system for an internal combustion engine having

a master ignition switch (2);

an ignition coil (6);

a main switching transistor (7), the emitter-collector path of which is connected in series with the primary (5) of the ignition coil (6) and having a control terminal (10) controlling the conduction state thereof;

ignition control switching means (25, 27; 35) connected to said control terminal (10) of the main switching transistor

(7) and controlling said main switching transistor selectively for conduction of current to store ignition energy in the coil and for blocking, to interrupt current flow through the primary (5) of the ignition coil (6) and thereby generate an inductive voltage pulse in the secondary (8) of the ignition coil to provide a spark pulse;

and comprising, in accordance with the invention

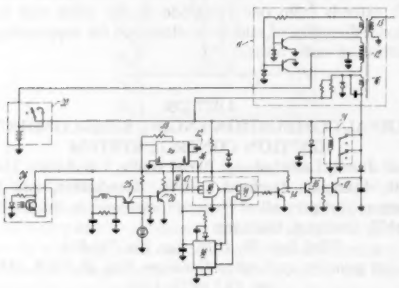
means to prevent generation of a spurious spark pulse upon opening of the master ignition switch (2) during a period of current flow of the main switching transistor (7) including

a protective circuit branch (14) connected in parallel with the primary (5) of the ignition coil (6) and including means (15) rendering said circuit branch conductive to inductive current from the ignition coil upon the opening of the master ignition switch (2) and thus interruption of power supply to the main switching transistor, said protective circuit branch (14) being connected to said control terminal (10) for the main switching transistor (7) and conducting a portion of the inductive current thereto to hold the main switching transistor (7) in at least partial conduction and permit gradual decay of the current flow through the primary (5) of the ignition coil and thus inhibit a spark pulse.

4,077,380
CONTROLLED-DURATION CONTINUOUS-WAVE HIGH-FREQUENCY IGNITION SYSTEM

Robert E. Canup, Chester, Va., assignor to Texaco Inc., New York, N.Y.

Filed May 14, 1975, Ser. No. 577,364
Int. Cl.² F02P *1/00*
U.S. Cl. 123—148 E **5 Claims**



1. In combination with an internal combustion engine, an ignition system wherein said system employs controlled-duration continuous-wave high-frequency spark energy,

said spark energy being generated by an oscillator having an output transformer and having a control winding thereon for starting and stopping oscillation of said oscillator at the beginning and end of each spark interval,

electronic switch means connected in series with said control winding for breaking and making a load circuit which includes said control winding,

engine-timed means for controlling said electronic switch means, and

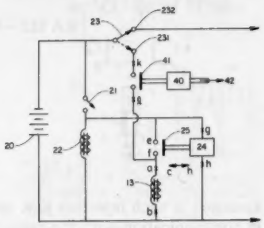
electronic circuit means comprising time constant means for connecting said engine-timed means to said electronic switch means,

said spark intervals being initiated and terminated by said engine-timed means at less than a predetermined speed of said engine and terminated by said time constant means at more than said predetermined speed.

4,077,381
GASOLINE ENGINE FUEL INTERRUPTER

Joseph Carl Firey, 1544 NE. 95th St., Seattle, Wash. 98115

Continuation-in-part of Ser. No. 330,968, Feb. 9, 1973, abandoned. This application Jul. 28, 1976, Ser. No. 709,621
Int. Cl.² F02N *17/00;* F02B *77/00*
U.S. Cl. 123—179 G **4 Claims**



4. The combination of a conventional gasoline engine wherein the improvement comprises interposing between the fuel metering device and the fuel delivery jet of the gasoline metering system of said gasoline engine the valve portion of a gasoline engine fuel interrupter device comprising said valve portion, a valve actuator portion, and a delay timer component;

said valve portion being positioned in the fuel flow channel of the gasoline metering system so that fuel flow to the engine is stopped when the valve is closed and the fuel may flow readily to the engine when the valve is open;

said actuator being a solenoid acting on a magnetic portion of the valve to close the valve when the solenoid is energized, and a valve spring acting to open the valve, said solenoid being energized by battery current via the engine starter switch and, in series therewith, the switch portion of a thermostatic releaser switch;

said delay timer component being the thermostatic element in the thermostatic releaser switch, heated by battery current via the engine starter switch, said thermostat element being so positioned that it mechanically opens the thermostatic releaser switch after being sufficiently heated by said battery current and is thus sufficiently deflected as to open said switch, such opening of said switch causing deenergizing of the solenoid and opening of the valve by the valve spring, the required time of heating of the thermostat element to said opening of said releaser switch, and thus the delay time interval of engine cranking during which the valve remains closed, being longer as the ambient temperature and thus the beginning temperature of the thermostat element becomes lower.

4,077,382
ROTARY VALVE FOR INTERNAL COMBUSTION ENGINES

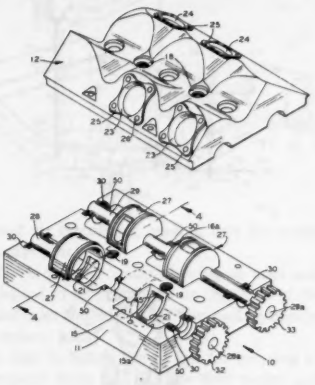
Carl A. Gentile, 260 Chase Rd., Columbus, Ohio 43214

Filed Oct. 6, 1975, Ser. No. 619,947
Int. Cl.² F01L *7/00*
U.S. Cl. 123—190 A **9 Claims**

1. Rotary valve apparatus for an internal combustion engine comprising

a cylinder head for an engine which includes at least one cylinder with the cylinder head adapted for mounting on the engine in operative relationship to the cylinder, said cylinder head having formed therein an intake valve chamber and an exhaust valve chamber, each of said chambers being of elongated cylindrical configuration, valve ports providing fluid communication between respective valve chambers and the engine cylinder and an intake port and an exhaust port providing fluid communication between a respective valve chamber and a respective intake or exhaust manifold; and

a rotary valve element of elongated cylindrical configuration coaxially disposed in each of said valve chambers for revolving movement in fluid flow controlling relationship to the respective valve port, each rotary valve element including a cylindrical tube mounted on a respective rotatable drive shaft journalled in said cylinder head and having an open end in fluid communication with either the



respective intake or exhaust port and an aperture formed in a cylindrical wall thereof at a position to align with the respective valve port for a predetermined time interval during each revolution of said rotary valve element and permit fluid flow therethrough, each of said valve chambers being of a length to extend a distance axially from the open end of the valve element, said intake or exhaust port communicating with the respective chamber extension.

4,077,383

INTERNAL COMBUSTION ENGINE WITH SOUND DEADENING JACKETING

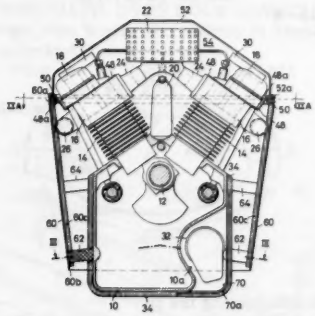
Ernst Hatz, Ruhstorf, Germany, assignor to Motorenfabrik Hatz GmbH & Co. KG, Ruhstorf, Germany

Filed Dec. 5, 1975, Ser. No. 638,169

Claims priority, application Germany, Dec. 11, 1974, 2458629

Int. Cl.[2] F02B *77/00*; F02F *7/00*

U.S. Cl. 123—198 E **8 Claims**



1. An internal combustion engine having an engine body and a cylinder housing, at least two cylinders in said cylinder housing, said cylinder housing being arranged in a V-formation, each half of the V-formation having at least two mating parts fastened together, comprising:

two separate support plates, each thereof being inclined to the vertical in opposed directions and clamped between said two mating parts of each half of said V-formed cylinder housing, each support plate having outwardly projecting coplanar rim means thereon defining a closed and planar frame which encircles both halves of said cylinder housing, the planes of each of said support plates being inclined to the plane of said frame;

sound deadening means completely jacketing the body of the engine and said cylinder housing, said sound deadening means comprising a plurality of sound deadening shells conforming to the shape of the engine body and covering the totality of said cylinder housing, at least one vibration deadening insert mounted on said frame;

releasable securement means for releasably securing each of said shells to each of said support plates, each shell bearing in sealed fashion to said vibration deadening insert on said frame; and

a spacer element inserted between said engine body and at least one of said shells, each spacer element providing a vibration dampening support holding said one of said shells at a fixed and spaced distance from said engine body.

4,077,384

TARGET PIGEON AND LAUNCHING APPARATUS THEREFOR

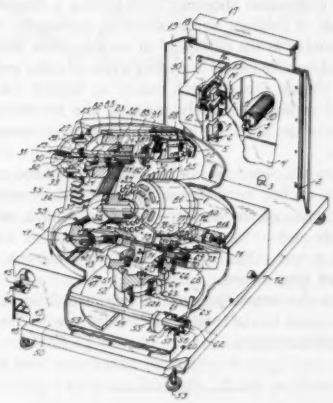
Ludovico Lante Montefeltro R., Avda. Libertador Edif.Siclar, 2°Piso, Ofic. No. 23, Caracas, Venezuela

Continuation-in-part of Ser. No. 604,069, Aug. 12, 1975, abandoned. This application Apr. 21, 1976, Ser. No. 679,135

Claims priority, application Venezuela, Aug. 19, 1974, 1768/74

Int. Cl.[2] F41B *15/00*

U.S. Cl. 124—1 **13 Claims**



1. An apparatus for throwing a target pigeon, said apparatus comprising:

a base;

a support pivotal on said base about an upright axis;

a launch head on said support rotatable about a launch axis inclined upwardly to the horizontal and having at said launch axis a tip engageable through a target pigeon;

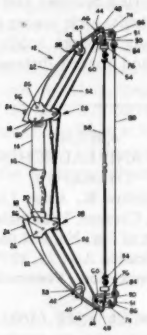
drive means including a motor connected to said support and to said launch head for oscillating said support about said upright axis and for rotating said head simultaneously about said launch axis, whereby a target pigeon fitted to said tip can be spun at high speed about said launch axis;

means responsive to longitudinal movement of a shaft and including a radially displaceable holding element at said tip lockingly engageable with a target pigeon fitted thereto for positively securing a target pigeon on said tip; and

means connected to said holding element and having a pushing element for releasing said holding element from a target pigeon engaged thereby and for pushing same off

said head with said pushing element when said head is spinning to launch said pigeon into the air.

4,077,385
COMPOUND BOW STRINGING DEVICE AND COMPOUND BOW INCLUDING THE SAME
Bert E. Fredrickson, 305 E. Walnut St., Green Bay, Wis. 54301
Filed Jul. 26, 1976, Ser. No. 708,861
Int. Cl.[2] F41B *5/00*
U.S. Cl. 124—24 R **23 Claims**



1. In a compound shooting bow having a handle portion with a pair of resilient limbs extending outwardly thereof, a pulley mounted at the outer end of each resilient limb, a bowstring, anchor wire means including a pair of outer ends, one of which is trained around each pulley to tension the resilient limbs, and means removably securing the bowstring to the outer ends of the anchor wire means, the improvement which comprises:

means on the outer ends of the limbs and on the outer ends of the anchor wire means to prevent movement of the outer ends of the anchor wire means back around the pulleys and to thereby maintain tension on the anchor wire means when the bowstring is removed from the anchor wire means;

whereby the bowstring can be removed from the anchor wire means loss of tension in the anchor wire means and in the resilient limbs.

4,077,386
BALL PROJECTING APPARATUS
Gustave Berliner, 3243 NE. 143rd Ave., Portland, Oreg. 97230
Continuation of Ser. No. 504,861, Sep. 11, 1974, abandoned.
This application Jun. 23, 1976, Ser. No. 698,898
Int. Cl.[2] F41B *15/00*
U.S. Cl. 124—78 **10 Claims**

6. In a ball-throwing robot,

throwing means for throwing a ball along a predetermined path,

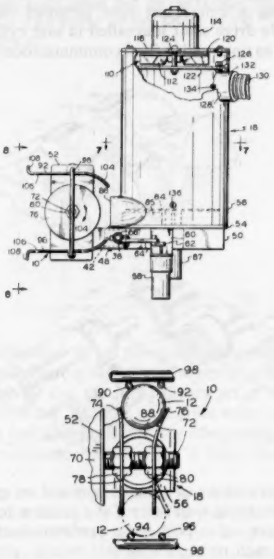
the throwing means including a pair of opposed gripping and throwing discs, and drive means for rotating the discs,

an elongated spin producing guide means,

and adjustable means mounting the guide means in selected positions extending along said path and engaging the periphery of a ball thrown along said path to spin the ball,

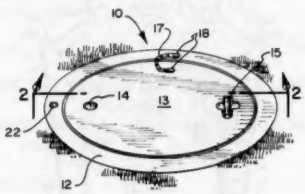
the guide means including a pair of elongated guide members,

the adjustable means being adapted to move the guide members selectively to positions in which only one of the members is engaged by the ball, only the other member is



engaged by the ball, and both of the members are engaged by the ball.

4,077,387
SELF EXTINGUISHING FIRE PIT
Donald L. Bateman, 215 7th St., Ogden, Utah 84404
Filed May 27, 1976, Ser. No. 690,439
Int. Cl.[2] F24C *15/08*
U.S. Cl. 126—8 **9 Claims**



1. A self extinguishing fire pit:

a. an upwardly extending fire wall having a flat upper surface,

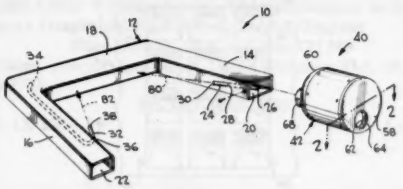
b. a rim having an inside diameter approximately the same as the outside diameter of a fire wall encompassing the upper portion of the fire wall and having an inwardly extending lip adapted to be seated over and rest upon only the outer portion of the upper flat surface of the fire wall,

c. a lid adapted to fit securely within the inwardly extending lip of the rim and rest upon the inner portion of the upper surface of the fire wall.

4,077,388
FORCED AIR CIRCULATION HEATING UNIT

Isaac C. Whiteley, 1629 S. Canyon Dr., Redmond, Oreg. 97756

Continuation-in-part of Ser. No. 545,402, Jan. 30, 1975. This application Apr. 14, 1975, Ser. No. 567,851
Int. Cl.[2] F24B 7/00
U.S. Cl. 126—121 9 Claims



1. A forced air circulating heating unit for installation in a fireplace comprising

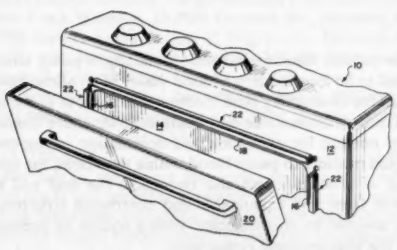
a generally U-shaped conduit having an inlet and an outlet and adapted to be positioned on the floor of the fireplace with said inlet and said outlet disposed on opposite sides of the fireplace; and

a blower unit including fan means for blowing air through said conduit from said inlet to said outlet such that air forced through said conduit is heated by fuel burned in the fireplace to supply a flow of hot air from said outlet of said conduit and housing means enclosing said fan means having an interior lining of heat and sound insulating material, said housing means including a cylindrical body, a first cap closing one end of said body and a second cap closing the other end of said body, said first cap having an opening therein through which said fan means draws air and said second cap having an opening therein through which air is forced by said fan means into said conduit inlet, and said fan means having an impeller and a motor mounted in said housing means with the edges of said impeller and motor protruding into said insulating material and said motor positioned to be cooled by air drawn through said opening in said first cap whereby said blower unit can be disposed within the fireplace with said fan means protected from heat and noise from said fan means reduced.

4,077,389
PNEUMATIC OVEN DOOR GASKET

K. Stuart Vogel, Fort Worth, Tex., assignor to Jamak Incorporated, Weatherford, Tex.

Filed Apr. 19, 1976, Ser. No. 677,892
Int. Cl.[2] F24C 15/04
U.S. Cl. 126—190 7 Claims



1. In an oven construction including in combination an oven including a door and a frame having confronting surfaces, and means for sealing the door when closed against the surface of the frame, said means comprising:

at least one elongate gasket member of elastomeric material having a first and a second section;

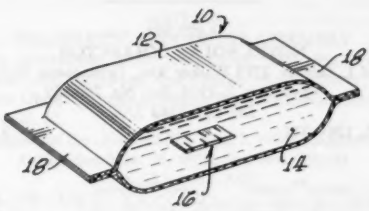
means for securing said first section in engagement along one of said confronting surfaces; and

said second section including elongate hermetic air chamber means, said chamber means having a substantial volume variable in response to temperature for selective expansion of the second section into sealing engagement between the first section and the second confronting surface when subjected to the heat of said oven.

4,077,390
REUSABLE HEAT PACK CONTAINING SUPERCOOLED SOLUTION AND MEANS FOR ACTIVATING SAME

Joseph Stanley, Topanga, and Griffith L. Hoerner, Santa Monica, both of Calif., assignors to Marc F. Fiedler, Sherman Oaks and Herman Siegel, Los Angeles, both of, Calif.

Filed Aug. 2, 1976, Ser. No. 710,394
Int. Cl.[2] F24J 1/00
U.S. Cl. 126—263 12 Claims



1. A heat pack comprising:

a flexible container;

a supercoolable aqueous sodium acetate solution carried within said flexible container; and

a flexible self contained activator strip disposed within said flexible container in intimate contact with said sodium acetate solution for initiating crystallization of said solution when supercooled, said activator strip having no dependency with said flexible container for said crystallization, said activator strip being formed from a ferrous material defining a thickness and a perimeter and including at least one fissure extending through said thickness and having a terminus inwardly of said perimeter.

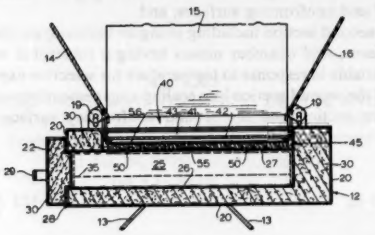
4,077,391
PORTABLE SOLAR COOKER AND THE SOLAR PANEL USED THEREIN

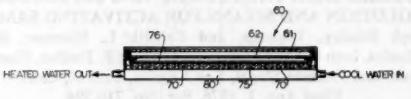
Lee V. Way, Jr., Rte. 3, Box 333C, Wilmington, N.C.

Filed Dec. 20, 1976, Ser. No. 752,622
Int. Cl.[2] F24J 3/02
U.S. Cl. 126—270 8 Claims

6. A solar panel comprising a housing enclosing a chamber containing a medium to be heated, said chamber having a substantially flat roof surface of heat conductive material, and a heat generating and transfer unit positioned above said chamber roof and comprising: (i) a first outer transparent window; (ii) a second inner transparent window spaced from said first window and, in conjunction with said first window, forming an insulating air space, said second window being spaced from

chamber roof and providing a heat generating space therebetween and (iii) a series of spaced apart strip members, each strip





member comprising a tubular member presenting an upper surface having a favorable heat absorbing color.

4,077,392

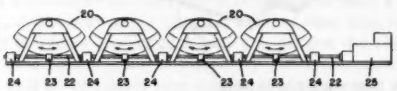
NOVEL SOLAR COLLECTOR

Richard L. Garner, 2211 Walker Ave., Greensboro, N.C. 27403

Filed Aug. 2, 1976, Ser. No. 710,859

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 **9 Claims**



1. A solar heat energy collector comprising; a pair of axially spaced-apart collector supporting plates, each of said plates having an arcuate base portion, an arcuate reflecting shell member secured to the arcuate base portions of said collector supporting plates, a frame for cooperatively supporting and pivotally mounting said supporting plates in spaced relation to said reflecting member, a heat collecting member extending axially and parallel to said arcuate reflecting member and equiradially spaced therefrom, said heat collecting member being supported on each frame and circumscribed by said collector supporting plates, said heat collecting member having a fluid passageway extending longitudinally therethrough, a disengageable collecting member securing means attaching said collector member to said supporting plates, a fluid transfer medium retained for flow through said heat collecting member, and heat transfer means supported in its said heat collecting means in the path of flow of said fluid whereby solar energy reflected from said arcuate reflecting shell member will be transmitted to said fluid through said heat collecting means and heat transfer means to said fluid transfer medium flowing through said heat collecting means.

4,077,393

SOLAR ENERGY HEAT COLLECTOR

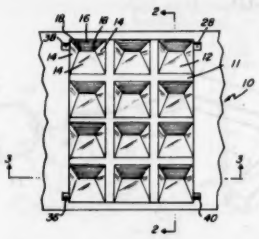
John P. Mattson, 123 Lake Shore Dr., Duxbury, Mass. 02332

Continuation-in-part of Ser. No. 621,759, Oct. 14, 1975, abandoned. This application Jan. 14, 1976, Ser. No. 649,032

Int. Cl.[2] F24J *3/02*

U.S. Cl. 126—271 **7 Claims**

1. A solar energy heat collector comprising an insulated base, a solar energy receiving means positioned adjacent said insulated base for absorbing radiant energy and converting said radiant energy to heat energy, means for circulating a heat exchange fluid in contact with said energy receiving means, means for introducing a heat exchange fluid to said circulating means, means for collecting said heat exchange fluid after contact with said energy receiving means and a cover means



transparent to radiant solar energy positioned in spaced relationship to said energy receiving means, said cover means comprising a surface having a plurality of discrete spaced raised portions, each said spaced raised portions having at least three surfaces angularly disposed to said cover surface to transmit radiant solar energy to said energy receiving means.

4,077,394

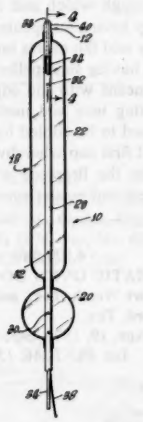
INTEGRAL PRESSURE SENSOR PROBE FOR A CARDIAC ASSISTANCE DEVICE

Martin D. McCurdy, 759 E. Foothill, Glendora, Calif. 91740

Filed Aug. 25, 1976, Ser. No. 717,493

Int. Cl.[2] A61B *19/00;* **A61M** *1/03*

U.S. Cl. 128—1 D **7 Claims**



1. A cardiac assistance device including a pump structure adapted to be inserted into a blood vessel of a patient having a conduit for conducting fluid medium into and out of the blood vessel and an expandable and contractile structure connected to said conduit for expansion and contraction in response to said fluid medium to pump blood within the vessel, the conduit having at least one wall and two ends, the first end being opposite from said expandable and contractile structure and being adapted to communicate with a source of pressurized fluid, the improvement comprising:

a pressure sensor probe which extends out of said conduit at its second end, said probe including a tube within at least a portion of said conduit, said tube having an outer diameter sized to fit loosely within said conduit without disrupting fluid medium flow therein, said tube having an open end adjacent the second end of said conduit and a second

end adapted for connected to a pressure sensing device, and a tip member attached between said tube and said conduit and forming a seal therebetween.

4,077,395
APPARATUS FOR TAKING BLOOD SAMPLES FROM A LIVING PATIENT

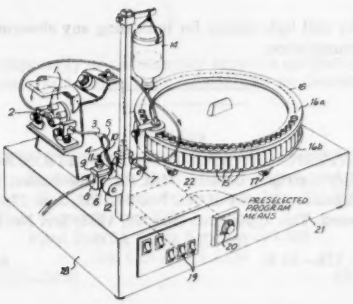
Ronald Alfred Woolner, London, England, assignor to St. Thomas's Hospital Medical School, London, England

Filed Oct. 12, 1976, Ser. No. 731,569

Claims priority, application United Kingdom, Oct. 15, 1975, 42365/75

Int. Cl.² A61B 5/00

U.S. Cl. 128—2 F **5 Claims**



1. A sampling apparatus comprising:
(a) a pump having
  (i) duplex inlets and a common outlet
  (ii) independently operable valves controlling the respective inlets
(b) means for connecting said first inlet to the vascular system of a patient
(c) a source of normal saline and means for connecting said second inlet to said source
(d) a series of collector vessels
(e) distributor means for selectively connnecting said pump outlet to each of said collector vessels in sequence
(f) control means for operating said pump, said inlet valves and said distributor means in accordance with a preselected program whereby at prescribed time intervals the pump is caused to draw a blood sample of chosen volume through said first inlet and to discharge it to an individual collector vessel and thereafter to draw saline from said second inlet to flush the pump while discharging the flushings to another collector vessel.

4,077,396
MATERIAL LAYER VOLUME DETERMINATION

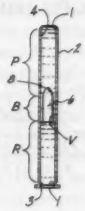
Stephen Clark Wardlaw, 16 Pine Orchard Rd., Branford, Conn. 06405; Robert Aaron Levine, 31 Pilgrim La., Guilford, Conn. 06437, and James Vincent Massey, III, 80 Driftwood La., Trumbull, Conn. 06610

Continuation-in-part of Ser. No. 673,058, Apr. 2, 1976, Pat. No. 4,027,660. This application Dec. 2, 1976, Ser. No. 746,935

Int. Cl.² A61B 5/14

U.S. Cl. 128—2 F **3 Claims**

1. For use in measuring the approximate white cell and platelet count in a centrifuged sample of whole anticoagulated blood, an apparatus comprising: a transparent tube for containing the centrifuged blood sample; at least one volume-occupying body formed from a material having a specific gravity in the range of about 1.02 to about 1.09 and disposed in said tube, said body being elongated along an axis which is substantially coincidental with the tube axis, said body being buoyant upon the red cell layer of the centrifuged blood sample, and said body being sufficiently movable within the tube so as to settle onto the red cell layer during centrifugation, said body being radially sized so as to form completely externally of said body a constricted free volume means adjacent to an inner surface of said tube and visible therethrough which constricted free volume means is operative to receive and axially elongate, by a multiple of at least about four, the extent of substantially all



of the white cell and platelet layers, and said body being formed with at least one axially and inwardly tapered end portion which prevents platelet cells from aggregating adjacent to the end surface of said body defined by said end portion.

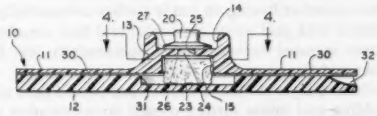
4,077,397
DIAGNOSTIC ELECTRODE ASSEMBLY

William Garrettson Ellis, Northfield, Ill.; Paul William Heavner, Jr., Kettering, and Charles W. Daugherty, Xenia, both of Ohio, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 512,588, Oct. 7, 1974, abandoned. This application Mar. 25, 1976, Ser. No. 670,403

Int. Cl.² A61B 5/04

U.S. Cl. 128—2.06 E **5 Claims**



1. A disposable electrode assembly for establishing an electrical connection to an underlying skin surface comprising, in combination:
a relatively flexible base member formed of electrically-insulating material having an outside surface and an inside surface;
contact means on said base member for establishing electrical contact with said underlying skin surface, said contact means including a first contact portion on said outside surface and a second contact portion in electrical communication with said first contact portion on said inside surface;
a cover member having an inside surface substantially coextensive with said inside surface of said base member, said cover member being, overall, substantially less flexible than the major extent of said base member and including a thumb recess along its margin at the inside surface to facilitate peeling said base member away therefrom; and
an adhesive layer on the inside surface of said base member holding said inside surface of said cover member against said inside surface of said base member so as to increase the rigidity of said electrode assembly during storage, said base member being peelable away from said cover member to enable said adhesive layer to be placed in contact with the underlying skin surface to hold said second contact portion in contact with the skin surface while the electrode assembly is in use.

4,077,398

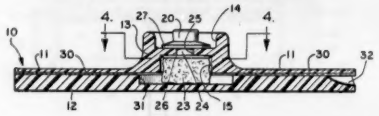
DIAGNOSTIC ELECTRODE ASSEMBLY

William Garrettson Ellis, Northfield, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Continuation of Ser. No. 512,586, Oct. 7, 1974, abandoned. This application Mar. 25, 1976, Ser. No. 670,404

Int. Cl.[2] A61B *5/04*

U.S. Cl. 128—2.06 E **11 Claims**



1. A disposable electrode assembly for establishing an electrical connection to an underlying skin surface comprising in combination:

a base member formed of electrically-insulating material having an outside surface and an inside surface;

said base member including a raised hub portion on said outside surface and a relatively flexible flange portion surrounding said hub portion, said hub portion including a recess forming an open-ended chamber on said inside surface, and a connecting aperture extending from said chamber to said outside surface;

means comprising an electrically conductive terminal having a first portion on said outside surface, a second portion in said open-ended chamber, and a third portion extending through said connecting aperture, said first portion being adapted to receive a connecting terminal;

means comprising a sponge-like contact member saturated with electrically conductive fluid disposed within said chamber in contact with said second portion of said terminal for establishing an electrically conductive path between said terminal and the adjacent skin surface;

a cover member having an inside surface substantially coextensive with said inside surface of said base member, said cover member being, overall, substantially less flexible than said flange portion; and

an adhesive layer on the inside surface of said base member holding said inside surface of said cover member against said inside surface of said base member so as to enclose said sponge-like contact member within said open-ended chamber and increase the rigidity of said electrode assembly during storage, said base member being peelable away from said cover member to enable said adhesive layer to be placed in contact with the underlying skin surface to hold said sponge-like contact member in contact with the skin surface while the electrode assembly is in use.

4,077,399

CRANIAL TRANSILLUMINATION DEVICE

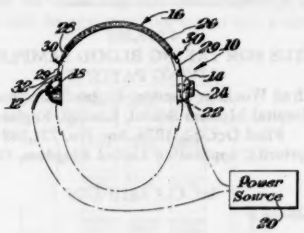
Pierre L. Le Roy, Wilmington, Del., assignor to New Research and Development Laboratories, Inc., Wilmington, Del.

Filed Aug. 3, 1976, Ser. No. 710,930

Int. Cl.[2] A61B *1/06*

U.S. Cl. 128—23 **7 Claims**

1. A cranial transillumination device comprising a first housing, said first housing being open at one end and otherwise light impervious, a light source mounted in said first housing, a second housing, said second housing being open at one end and otherwise light impervious, a light sensor mounted in said second housing, mounting means in the form of a headband connecting said first and second housings with said open ends disposed toward each other, said headband being shaped to attach on the patient's head with said light source and said light sensor juxtaposed the patient's head in line with each other so that light may pass through the patient's head from said light source to reach and be detected by said sensor, and said first and second housings being made of a material capable of fitting snugly against the head of the patient to close said open ends whereby light emitted from said light source would be detected by said light sensor for indicating any abnormal spinal fluid accumulation.



4,077,400

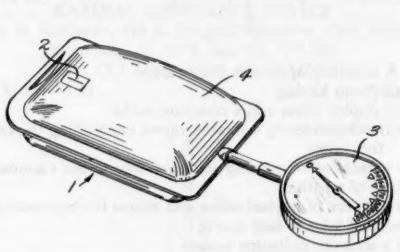
EXTERNAL CARDIAC RESUSCITATION AID

Roy Major Harrigan, Bromley Mtn. Rd., Manchester, Vt. 05254

Continuation-in-part of Ser. No. 541,762, Jan. 17, 1975, abandoned. This application Aug. 29, 1975, Ser. No. 609,109

Int. Cl.[2] A61H *1/00*

U.S. Cl. 128—24 R **65 Claims**



1. Apparatus for use in administering cardiopulmonary resuscitation to a prone, face-up human patient, comprising:

means for placement on the chest of the patient between a user's hands and the patient's chest for receiving and transmitting forces to the patient's chest, the forces applied by placing the user's hands directly onto the receiving and transmitting means during cardiopulmonary resuscitation;

means in operative relationship with said receiving and transmitting means for sensing the forces directly applied to said receiving and transmitting means by the user's hands; and

means configured to be normally and easily placed on the chest of the patient during use and in operative relationship with said sensing means and with said receiving and transmitting means for indicating the forces applied to the patient's chest

---

4,077,401

SUPPRESSION OF SPERMATOGENESIS

Mostafa S. Fahim, 500 Hulen Dr., Columbia, Mo. 65201

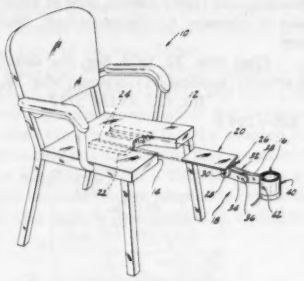
Filed Apr. 6, 1976, Ser. No. 674,110

Int. Cl.[2] A61H *19/00*; **A61F** *7/00*

U.S. Cl. 128—24 A **12 Claims**

1. A method of suppressing spermatogenesis in human males having scrotal testes which comprises applying continuous ultrasonic vibrations selectively only to the testes of said

human male at an effective power level and at a frequency sufficient to penetrate said scrotal testes and for a sufficient



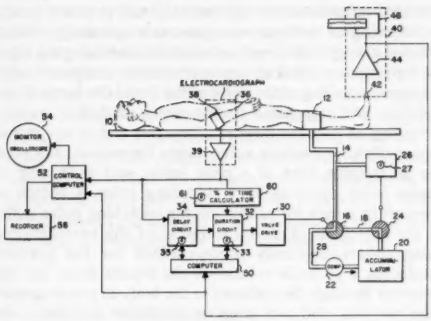
time to temporarily or permanently suppress spermatogenesis while causing said human male substantially no discomfort.

4,077,402

APPARATUS FOR PROMOTING BLOOD CIRCULATION

J. Malvern Benjamin, Jr.; D. Ridgely Bolgiano, and Carl R. McHenry, all of c/o Bionic Instruments, Inc., 221 Rock Hill Road, Bala Cynwyd, Pa. 19004

Filed Jun. 25, 1976, Ser. No. 699,699
Int. Cl.[2] A61H *1/00*
U.S. Cl. 128—24 R **10 Claims**



1. Apparatus for promoting blood circulation in a body area of a patient comprising:

an inflatable cuff means adapted to be attached to a part of the patient for applying pressure to such part upon inflation of the cuff means,

means for supplying fluid under pressure,

conduit means interconnected between said pressure supply and said cuff means for transmitting fluid under pressure from said pressure supply to said cuff means,

means for controlling the flow of fluid through said conduit means for controlling the inflation of said cuff means,

means for sensing the heartbeat of the patient, and

means for sensing the blood flow in a part of the patient distal to said cuff means.

4,077,403

PORTABLE FRAME FOR DOORWAY MOUNTING OF A TRAPEZE BAR

Victor Steele, 6311 Yucca St., Hollywood, Calif. 90028

Filed Apr. 2, 1976, Ser. No. 672,927
Int. Cl.[2] A61H *1/02*
U.S. Cl. 128—75 **4 Claims**

1. In combination, a portable doorway mounting frame assembly, a body suspension device and a doorway formed of laterally opposed vertical door frame beams and having vertical, door molding strips fixed to said vertical door frame beams to define thin vertical shoulders, said body suspension device comprising:

a horizontal, cylindrical trapeze bar,

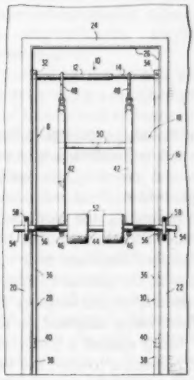
a pair of parallel vertical straps,

one end of each strap being fixedly secured to said cylindrical trapeze bar at an axially displaced position relative to the other and spaced from each other by a distance greater than the width of a human body in its pelvic region,

hooks carried by the upper ends of said straps,

at least one platform member rotatably disposed on said trapeze bar and having at least one flat padded face which face when directed upwardly serving to support the weight of a person's body when his upper thighs are brought into horizontal contact with said face and with a portion of the body above the pelvic region disposed in a pendent position downwardly from one of said platform face, such that with the legs of the body being bent back at the knees at an angle of approximately 45°, the sole of each foot may be placed in contact with one of said straps,

said portable doorway mounting frame assembly comprising:



a pair of sectional vertical doorway riser tubes, said riser tubes contacting respective door frame beams and said strip shoulders,

concentric telescoping cylindrical tube defining a telescoping frame cross bar,

circular holes within the upper ends of said riser tubes on the sides facing each other and receiving respective ends of said telescoping frame cross bar tubes such that with one cross bar tube extended relative to the other the sides of doorway riser tubes are positioned in abutment with opposed vertical door frame beams to maintain frame assembly stability,

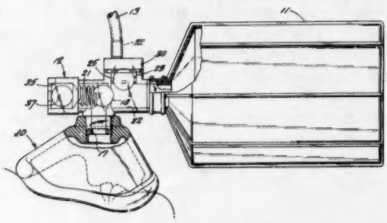
said hooks coupled to the ends of said straps overlying said concentric telescoping tubes of said telescoping frame cross bar to effect suspension of said body suspension device with said trapeze bar horizontal, said trapeze bar being of a width such that the ends of said trapeze bar extend to each side, beyond said vertical door frame beams, whereby the ends of the trapeze bar in extending to each side beyond the vertical door frame beam act in conjunction with the vertical door molding strips to provide stability to the portable doorway mounting frame assembly and prevent swinging of the trapeze bar during use.

4,077,404

BREATHING EQUIPMENT SUCH AS RESUSCITATORS

James O. Elam, Chicago, Ill., assignor to H. B. W. Medical Instruments Manufacturing Company, Inc., Arcadia, Calif.

Continuation-in-part of Ser. No. 614,030, Sep. 17, 1975, Pat. No. 4,037,595. This application Oct. 19, 1976, Ser. No. 733,755
Int. Cl.[2] A61M *16/00*
U.S. Cl. 128—145.8 4 Claims



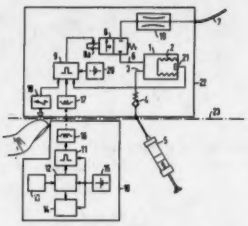
1. A resuscitator valve mechanism including a valve chamber having opposed end walls spaced a predetermined distance from each other and joined by side walls, opposed inspiration and expiration ports in said end walls, respectively each having a valve seat surrounding the port, said valve seats facing toward each other, and the chamber having a port in a side wall of said chamber between said opposed end walls for communication with the patient's lungs, a valve in said chamber having opposed spherical surfaces facing away from each other, said surfaces being disposed on the longitudinal axis of said valve and being spaced a predetermined distance from each other, and presented toward the valve seats at the opposite ends of the chamber, the valve having clearance adjacent the side walls of the chamber to allow for passage of gas and being movable in opposite directions to engage either of the valve seats and close one or the other of the opposed ports, a spring urging the valve away from the expiration port seat, and the valve mechanism having means providing for connection of a source of pressurized inspiration gas and for directing such pressurized gas to the inspiration port, the valve being movable away from the inspiration valve seat under the influence of the pressurized gas, the spring being a helical coil compression spring with one end seated against an end of the valve chamber around the expiration port and the other end presented toward the valve for engagement therewith, the length of said expiration port seat being greater than the length of said spring when fully compressed such that said spring is deflectable sufficiently to provide for engagement of the valve with the expiration port seat and thus close the expiration port, the length of the spring when fully expanded being less than the difference of the predetermined distance which said end walls are spaced and the longitudinal distance which said spherical surfaces are spaced whereby, the length of the spring is less than that required to urge the valve into engagement with the inspiration port seat, and the valve being of low mass and its motion being unquided except for the action of said spring and of gas flow through the valve chamber, thereby providing for substantially unrestrained displacement of the valve from the inspiration valve seat under the influence of even weak spontaneous inspirational effort by the patient.

4,077,405

APPARATUS FOR INFUSING LIQUIDS INTO HUMAN OR ANIMAL BODIES

Rainer Haerten, and Heinz Kresse, both of Erlangen, Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Mar. 22, 1976, Ser. No. 669,459
Claims priority, application Germany, Mar. 26, 1975, 2513467
Int. Cl.[2] A61M *5/14*
U.S. Cl. 128—214 F 10 Claims



7. An apparatus for infusing of liquid into a human or animal body comprising a catheter for extending into a blood stream of a body, a supply reservoir for the liquid having a discharge conduit, pressure generator means for applying a pressure on the liquid in the supply reservoir to cause discharge through the discharge conduit, and an adjustable dosing means attached between the catheter and the discharge conduit for producing a desired infusion rate in the catheter, said pressure generator means being an over-pressure generator operating without an external energy source and constantly maintaining the liquid in the supply reservoir at an excess pressure as compared with the pressure prevailing at the point of the liquid discharge from the catheter, said adjustable dosing means including means for providing an infusion flow at a base rate and means including a controllable switching valve means for periodically producing an infusion flow at a peak value, said switching valve means being operable by a switching pulse, a switch pulse transmitter means for producing the switching pulse with one of the repetition rates and duration of the switching pulses being programmatically predetermined for the purpose of producing a periodic release of the liquids from the supply reservoir through the catheter to the body at pre-programmed time intervals, said over-pressure generator including a sensor means for sensing a change in one of the temperature and pressure of the over-pressure generator, said sensor means being coupled to the switch pulse transmitter means to effect a change of liquid flow by adjusting the switch pulse duration in inverse proportion to the adjusting the switch pulse duration in inverse proportion to the change in pressure in the over-pressure generator.

4,077,406

PELLET IMPLANTER FOR ANIMAL TREATMENT

Ellsworth Roland Sandhage, Pearl River, and Arthur Sinclair Taylor, Spring Valley, both of N.Y., assignors to American Cyanamid Company, Stamford, Conn.

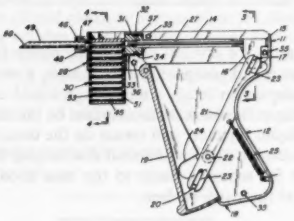
Filed Jun. 24, 1976, Ser. No. 699,739
Int. Cl.[2] A61M *5/18*
U.S. Cl. 128—217 2 Claims

1. A pellet implanter for implanting at least one solid pellet in a selected location beneath the skin of a domestic animal comprising:

a two-piece main frame having a functionally integral pistol grip, a plunger slide groove in said main frame, a reciprocating plunger slide sliding in said plunger slide groove, a plunger fixed with relationship to said plunger slide which plunger is retractable into said main frame and extendable from the front of said main frame, an operating trigger pivotally attached to said main frame, a connecting link

means between said operating trigger and said plunger slide to move the plunger slide forward on pulling the trigger, a biasing spring to move the plunger slide rearwardly on release of the trigger, and a hollow cylindrical magazine receiver clamping sleeve, having a retaining ring, in the front of the main frame;

a C-shaped magazine receiver, having therein a magazine feed slot which is adapted to receive and hold a magazine, said slot being generally rectangular, but having one corner larger than the others and thereby adapted to receive a magazine in only one orientation, said magazine feed slot having lips adapted to hold a magazine in location and having a gap between the lips adapted to expose the major portion of one face of a magazine, a cylindrical boss,



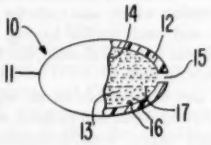
having a retaining groove, integral with the magazine receiver, which boss fits into and is held by said clamping sleeve, said retaining ring and said retaining groove permitting rotation of the magazine receiver with respect to the main frame on slight loosening of the clamping sleeve, and complete disassembly on further loosening of the clamping sleeve, a positioning detent in the magazine receiver adapted to control the movement of a magazine along its axis, a hypodermic needle holding collet on the other side of the magazine receiver, and a hypoderic needle in said collet, the plunger, the clamping sleeve, the cylindrical boss, the collet and the hypodermic needle being coaxial, and adapted to be in alignment with a pellet chamber in a magazine in the magazine receiver.

4,077,407

OSMOTIC DEVICES HAVING COMPOSITE WALLS

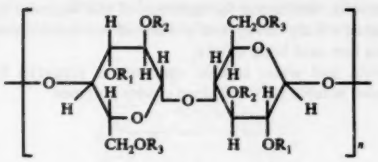
Felix Theeuwes, Los Altos, and Atul D. Ayer, Belmont, both of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Filed Nov. 24, 1975, Ser. No. 634,859
Int. Cl.² A61M *31/00*
U.S. Cl. 128—260 **11 Claims**

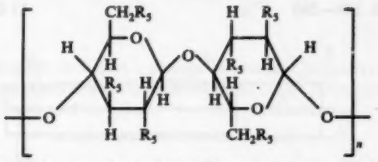


1. An osmotic device for dispensing a drug to an animal comprising:

(a) a shaped wall that is substantially inert and maintains its physical and chemical integrity during the controlled dispensing of the drug comprising: (1) a semipermeable wall forming material that is permeable to the passage of an external fluid and substantially impermeable to the passage of the drug, said semipermeable material being a polymer of the following formula



wherein R_1, R_2, and R_3 are selected from the group consisting of hydrogen, alkyl, alkenyl, and acyl and n is greater than 5, and (2) a stabilizing material that imparts inertness and stability to the wall, and which stabilizing material is a different polymer of the following formula:



wherein R_3 is a member selected from the group consisting of hydroxyl, alkoxy, hydroxyl-substituted alkoxy, alkylcarbonate, alkylcarbamate, alkylsulfonate, alkylsulfamate, and acyloxy, and n is greater than 5;

(b) a compartment formed by the shaped wall and containing the drug, said drug being a member selected from the group consisting of locally and systemically acting drugs;

(c) a passageway in the wall communicating with the compartment and the exterior of the device for dispensing the drug from the device; and,

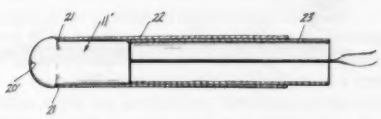
(d) wherein in operation when the device is dispensing the drug to the animal, fluid therefrom is continuously imbibed through the wall into the compartment in a tendency towards osmotic equilibrium at a rate determined by the permeability of the wall and the osmotic pressure gradient across the wall, thereby forming a solution containing drug which is dispensed through the passageway at a controlled rate, with the wall substantially maintaining its inertness and integrity in the presence of the drug and solution thereof over a prolonged period of time.

4,077,408

CATAMENIAL DEVICE EMPLOYING POLYMERIC CONSTRAINING MEANS

Jerome L. Murray, 652 First Ave., New York, N.Y. 10016, and Frances R. Gardiner, 43 Park Rd., Sparta, N.J. 07871

Continuation-in-part of Ser. No. 436,391, Jan. 24, 1974, abandoned. This application May 7, 1975, Ser. No. 575,202
Int. Cl.² A61F *13/20*
U.S. Cl. 128—285 **13 Claims**



1. A catamenial device comprising:

a segment of hydrophilic polymeric foam which is held in mechanical compression to less than 50 percent of its original dry volume said segment capable of re-expansion in the dry state; and

an external, self-sustaining, water-soluble container within which said segment is placed subsequent to the imposition thereon of said mechanical compression, said container serving to substantially hold said segment in said compres-

sion therewithin, along the entire length of said segment, provides lubrication for insertion of said segment into an animal's body cavity and is adapted for rapid disintegration into said body cavity,

wherein said water soluble container is prepared from a water soluble poly (alkalene oxide) polymer.

4,077,409

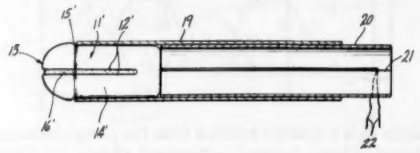
ENCAPSULATED CATAMENIAL DEVICE

Jerome L. Murray, 652 First Ave., New York, N.Y. 10016, and Frances R. Gardiner, 43 Park Rd., Sparta, N.J. 07871

Continuation-in-part of Ser. No. 436,391, Jan. 24, 1974, abandoned. This application May 7, 1975, Ser. No. 575,201

Int. Cl.² A61F *13/20*

U.S. Cl. 128—285 **11 Claims**



1. A catamenial device comprising:

a segment of hydrophilic polymeric foam which is held in mechanical compression to less than 50 percent of its original dry volume said segment capable of re-expansion in the dry state; and

an external, self-sustaining, water-soluble container within which said segment is placed subsequent to the imposition thereon of said mechanical compression, said container serving to substantially hold said segment in said compression therewithin along the entire length of said segment, provides lubrication for insertion of said segment into an animal's body cavity and is adapted for rapid disintegration into said body cavity by the provision of a plurality of perforations in the outer surface thereof.

4,077,410

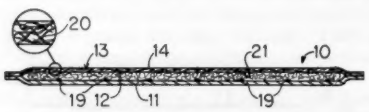
DISPOSABLE ABSORBENT PAD WITH NON-WOVEN FACING

George A. M. Butterworth, Western Springs, and Robert T. Elias, Downers Grove, both of Ill., assignors to Johnson & Johnson, New Brunswick, N.J.

Filed Jul. 6, 1976, Ser. No. 702,397

Int. Cl.² A41B *13/02*; A61F *13/16*

U.S. Cl. 128—287 **18 Claims**



1. An absorbent pad comprising a flexible, body fluid-impermeable backing sheet, a layer of absorbent material on said backing sheet, and a soft, body fluid-permeable facing sheet overlying said absorbent material; said facing sheet being non-woven, open but interconnected network of molecularly oriented, thermoplastic polymer fiber elements having a mean denier of not greater than 3; said facing sheet having a bulk density of about 0.05 grams/cubic centimeter to about 0.15 grams/cubic centimeter, said fiber elements exhibiting a birefringence greater than 0.005 and being molecularly oriented substantially in the plane of the facing sheet.

4,077,411

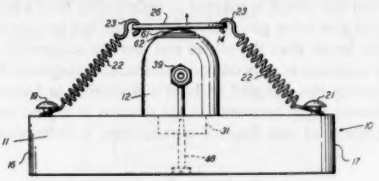
KERATOPLASTY DEVICE

Donald E. Ward, 11158 Danbury St., Arcadia, Calif. 91006

Continuation-in-part of Ser. No. 569,219, Apr. 18, 1975, abandoned. This application Apr. 6, 1976, Ser. No. 674,081

Int. Cl.² A61B *17/00*

U.S. Cl. 128—303 R **7 Claims**



1. Apparatus for corneal tissue keratoplasty for use with a liquid injector and comprising a work base, a work surface on the base adapted to retain a miniscus, a liquid conduit in the base opening at the work surface, means on the base adapted to receive a liquid injector, said means on the base connecting to the liquid conduit and said conduit discharging from the base, and means for securing tissue to the base about the conduit discharge at the work surface.

4,077,412

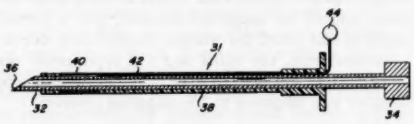
STOMACH INTUBATION AND CATHETER PLACEMENT SYSTEM

Mohamed H. Moossun, Box 237-RR4, Elizabethtown, Ky. 42701

Division of Ser. No. 532,735, Dec. 13, 1974, Pat. No. 3,961,632. This application Mar. 9, 1976, Ser. No. 665,338

Int. Cl.² A61B *17/34*

U.S. Cl. 128—347 **5 Claims**



1. A catheter and external securing device therefor comprising in combination, a disc having a central aperture therethrough for slidably receiving said catheter,

said disc having a lateral slot extending between said aperture and the disc periphery,

said catheter being substantially rigid and having a through bore including axially aligned openings at either end thereof,

an elongated needle having a puncturing point thereon for slidable reception within said catheter bore, and

said catheter and said needle having enlarged portions thereon adjacent one end thereof, for facilitating manipulation and use thereof,

whereby said disc slot permits lateral sliding movement of said disc onto and about said catheter at a point intermediate the length thereof without requiring removal of the same from a body.

4,077,413

DEFIBRILLATOR

Leslie W. Partridge, Janesville, Wis., assignor to The Burdick Corporation, Milton, Wis.

Filed May 4, 1976, Ser. No. 683,016

Int. Cl.² A61N *1/36*

U.S. Cl. 128—419 D **32 Claims**

30. A defibrillator unit usable for applying a controlled electrical shock to a patient comprising:

means including a pair of electrodes for making electrical contact to the patient;

a storage capacitor;

means for charging said storage capacitor, said charging means including an inductor and means connected to said inductor for establishing a predetermined current flow through said inductor, said current flow establishing means including means for abruptly interrupting the flow of current through said inductor when said current flow reaches a predetermined level;

means responsive to the current flow through said inductor for generating a voltage transient upon the termination of said current flow;

means coupling said voltage transient generating means to said storage capacitor for applying said voltage transient to said capacitor to effect charging of said capacitor;

means coupled to said charging means for terminating the operation of said charging means when the charge on said capacitor reaches a predetermined level, said terminating means including means for monitoring the amplitude of the transients generated by said voltage generating means and for terminating the charging of said capacitor when the amplitude of said transients reaches a predetermined level; and

means for selectively connecting said storage capacitor to said electrodes.

4,077,414
SMOKING ARTICLES

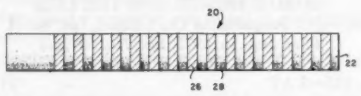
Richard Roland Baker, Southampton; Sydney James Green, Peaslake, and Keith Douglas Kilburn, Southampton, all of England, assignors to Brown & Williamson Tobacco Corporation, Louisville, Ky.

Filed Jan. 9, 1976, Ser. No. 647,771

Claims priority, application United Kingdom, Jan. 9, 1975, 989/75

Int. Cl.² A24D *1/02*

U.S. Cl. 131—8 R **6 Claims**



1. A smoking article with a reduced smoldering rate having a wrapper of paper provided with a series of narrow, encircling bands of low paper porosity alternated along the length of the article with bands of higher paper porosity, said low porosity bands being from 1.0 to 3.0 mm in width and having a paper porosity within the range of 0 to 100 and said higher porosity bands being from 0.1 to 3.0 mm in width and having a paper porosity within the range from 150 to 2,000 in order to be able to control the burn rate and increase the puff number.

4,077,415
PARTICULARLY TO THE MANUFACTURE OF FILTER-TIPPED CIGARETTES

Edward George Preston, and Clifford Russell Marritt, both of London, England, assignors to Molins Limited, England

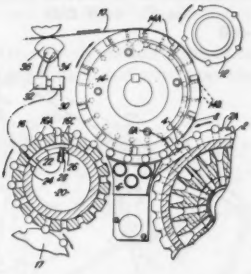
Filed Sep. 9, 1975, Ser. No. 611,687

Claims priority, application United Kingdom, Sep. 17, 1974, 40449/74

Int. Cl.² A24C *1/32, 5/48, 5/58*

U.S. Cl. 131—76 **12 Claims**

1. A filter attachment machine for use in the manufacture of filter-tipped cigarettes, comprising means for joining filter portions to cigarette portions by rolling adhesive-coated paper around adjacent parts of corresponding filter and cigarette portions, conveyor means including a conveyor having a plurality of ports therein for conveying the completed assemblies at regular intervals, a stationary pressure chamber positioned adjacent to the conveyor to communicate successively with said ports in the conveyor which are closed by the completed assemblies, a source of pressure connected to the pressure chamber, and detector means for monitoring the pressure in



the chamber to detect a change in pressure indicative of the absence of any assembly in at least one of the ports communicating with said chamber.

4,077,416
APPARATUS FOR TREATING ARTICLES

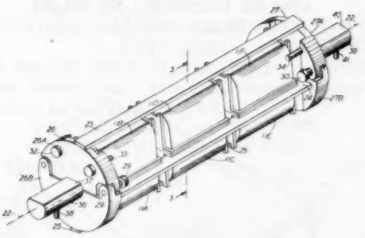
Anderson F. Johnson, Jr., Sinking Spring; Edward L. Stork, Ephrata, and Richard H. Winings, St. Lawrence, all of Pa., assignors to Westinghouse Electric Co., Inc., New York, N.Y.

Division of Ser. No. 534,918, Dec. 20, 1974, Pat. No. 3,977,926.

This application Apr. 23, 1976, Ser. No. 679,581

Int. Cl.² B08B *3/04*

U.S. Cl. 134—159 **13 Claims**



1. Apparatus for treating an article comprising:

first and second carriers, each having a slot for holding the article, an opening for insertion and removal of the article, and at least one other opening for passage of a treating medium when the carriers are submersed in the treating medium;

means for holding the first and second carriers such that the openings for insertion and removal of the article are adjacent and the slot of the first carrier is substantially aligned with the slot of the second carrier;

means for supporting the held carriers when submersed in the treating medium; and

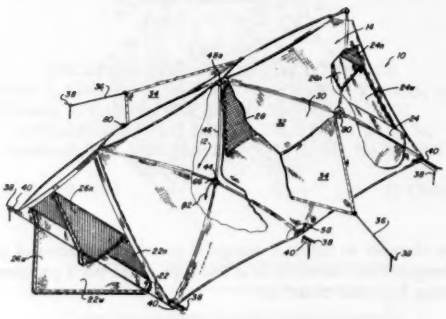
means for moving the held carriers at a speed and along a path in the treating medium to permit a repetitious movement of the article back and forth between the carriers and through the treating medium.

4,077,417

COMBINATION TENT AND FRAME THEREFOR

Allan E. Beavers, Littleton, Colo., assignor to T. A. Pelaue Company, Englewood, Colo.

Filed Jun. 3, 1976, Ser. No. 692,538
Int. Cl.[2] A45F *1/16*
U.S. Cl. 135—3 R 20 Claims



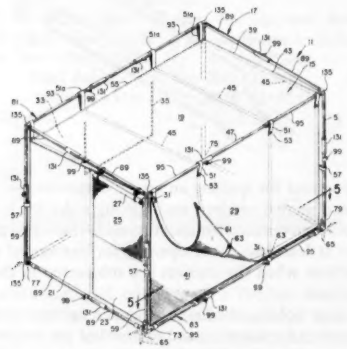
1. In a tent structure, a pair of rectangular wall-forming subassemblies each of which includes an X-shaped subframe, said subassemblies having the upper marginal edges thereof hingedly interconnected, both of said subframes including a centrally-located hub together with four springable struts having adjacent ends connected to said hub for movement between a folded position nested together in side-by-side bundle-forming relation and an unfolded position radiating diagonally therefrom in angularly-spaced relation to one another, and each of said wall-forming subassemblies also including foldable means stretched taut between the ends of the struts remote from the hub cooperating therewith to maintain said struts in fixed angularly-spaced relation and bowed in a stable umbrella-like fashion when unfolded.

4,077,418

QUICKLY ERECTED BACK PACK TENT

Wilfred Cohen, 11812 Mt. Robert Ct., Fountain Valley, Calif. 92708

Filed Jul. 12, 1976, Ser. No. 704,193
Int. Cl.[2] A45F *1/16*
U.S. Cl. 135—4 R 7 Claims



1. A collapsible tent structure, comprising:

a primary unitary collapsible support framework formed of a plurality of lightweight, high tensile tubular strut members connected by a plurality of hinged fittings permitting pivotal movement of the component strut members to allow said framework to be folded into a compact inverted U-shape for carrying or unfolded into a substantially three dimensional rectangular frame structure for utilization as a tent support structure, said framework in its unfolded position comprising two rectangular frames pivotally connected together at each corner by four corner upright struts, both of said corner upright struts being foldable so that said framework can be collapsed into a generally flat elongated bundle which is then folded into said compact inverted U-shape without disconnecting any of said strut members, each edge of said rectangular frame being formed by at least two of said pivotally connected struts and the longest edge thereof being formed by no less than three of said pivotally connected struts with the maximum strut length (and, therefore, maximum length of any side of the folded U-shape configuration) being substantially less than the shortest edge of the unfolded rectangular frame;

a foldable fabric tent of a rectangular box-like configuration having a roof, side, and floor panels;

means for attaching said foldable fabric tent to said primary collapsible support framework, said tent remaining attached to said framework in both its folded and unfolded positions; and

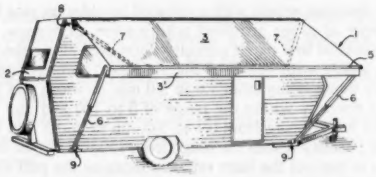
means for locking said plurality of hinged fittings within the primary support framework in an unfolded, extended position.

4,077,419

AWNING APPARATUS FOR TRAVEL TRAILERS, MOBILE HOMES, AND THE LIKE

Phil Lux, 54369 Susquehanna Ct., Elkhart, Ind. 46514

Filed Jun. 16, 1975, Ser. No. 587,212
Int. Cl.[2] E04F *10/06*
U.S. Cl. 135—5 AT 17 Claims

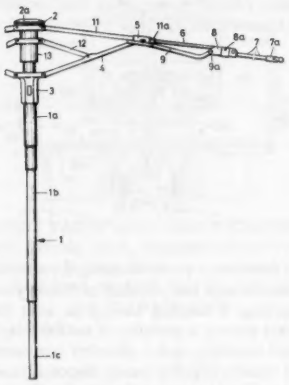


11. Awning apparatus comprising holding means for holding a roller bar means of a canopy awning of the type wherein the canopy means is wound around the roller bar means when in a storage position, said holding means including means for selectively holding said roller bar means in respective canopy in-use and storage positions, said holding means including side arm means and rafter arm means, said side arm means including a side arm member having one end thereof attachable to an end of said roller bar means and the other end thereof attachable to a relatively fixed structure, said rafter arm means including a rafter arm member having one end attachable to said relatively fixed structure and the other end thereof detachably attachable to said roller bar means, said other end of said rafter arm member being attachable to said roller bar means at a position intermediate the ends of the roller bar means and intermediate the places occupied by the lateral edges of the canopy means when the canopy means is attached to said roller bar means in a canopy in-use position.

4,077,420
SHORTENABLE UMBRELLA

Tilmann Schultes, and Joachim Seidel, both of Solingen, Germany, assignors to Kortenbach & Rauh Kommanditgesellschaft, Solingen, Germany

Filed Apr. 6, 1977, Ser. No. 784,977
Claims priority, application Germany, Apr. 10, 1976, 2615731
Int. Cl.² A45B *19/04*
U.S. Cl. 135—25 R **6 Claims**



1. A shortenable umbrella having blades carrying the umbrella canopy, the blades being shortenable by telescoping and/or folding, and having a shortenable rod assembly and a crown secured on the shortenable rod assembly and for each innermost blade at least one fork operatively connected by means of at least one slider, the latter displaceably disposed on the shortenable rod assembly, for pivoting the blades, comprising

an innermost blade being pivoted on the crown,

an outermost blade having an extension,

a middle blade operatively connected to said innermost and outermost blades, respectively,

a fork being operatively connected to said blades and to the slider,

a control rod operatively connected to said extension of said outermost blade, said outermost blade being hinged foldably onto said middle blade and actuatable therefor by means of said control rod,

said control rod having an inner end forming a guide opening, said fork extending through said guide opening, said opening defining an enlarged area in proportion to the cross-section of said fork, whereby said inner end of said control rod is displaceable in a longitudinal direction of said fork and/or of said control rod.

4,077,421
SHORTENABLE UMBRELLA

Tilmann Schultes, and Joachim Seidel, both of Solingen, Germany, assignors to Kortenbach & Rauh Kommanditgesellschaft, Solingen, Germany

Filed Apr. 6, 1977, Ser. No. 784,976
Claims priority, application Germany, Apr. 10, 1976, 2615732
Int. Cl.² A45B *19/04*
U.S. Cl. 135—25 R **5 Claims**

1. A shortenable umbrella having frame parts including blades carrying the umbrella canopy in opened condition, the blades being shortenable at least by a factor of two by telescoping or folding, and having a shortenable rod assembly and a crown secured on the shortenable rod assembly and at least one set of forks operatively connected by means of at least one slider, the latter displaceably disposed on the shortenable rod assembly, for pivoting the blades, comprising

an innermost blade part being pivoted on the crown,

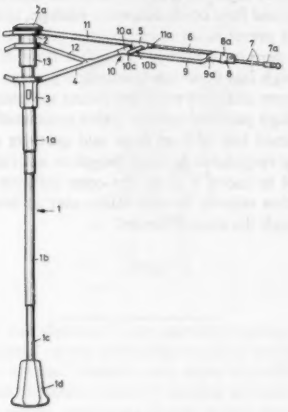
an outermost blade part having an extension,

a middle blade part operatively connected to said innermost and outermost blade parts, respectively,

a fork operatively connected to the slider,

a middle hinge operatively pivotally connecting said middle blade part and said fork at an articulation point of said fork,

a control rod operatively connected to said extension of said outermost blade part, said outermost blade part being



hinged foldably onto said middle blade part and actuatable therefor by means of said control rod,

said control rod having an inner end,

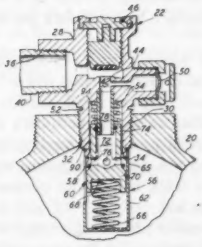
a control piece constituting a slide hinge being pivotally articulated to said inner end of said control rod, said slide hinge being displaceably disposed on said fork,

said slide hinge including a connection means for articulating said slide hinge onto said middle hinge spaced from said articulation point of said fork, said control piece being actuated by movement of said fork.

4,077,422
FLOW CONTROL MEANS FOR COMPRESSED GAS CYLINDERS

Robie G. Brinkley, 708 S. Main St., Morton, Ill. 61550, and Gerry D. Welton, Peoria, both of Ill., assignors to said Robie G. Brinkley by said Gerry D. Welton

Filed Nov. 17, 1975, Ser. No. 632,282
Int. Cl.² F17C *13/12*; F16K *17/30*
U.S. Cl. 137—68 R **12 Claims**



1. A flow control means for a compressed gas cylinder having a high-pressure control valve arranged to control the flow of gas from said cylinder, wherein the improvement comprises:

a fail-safe shutoff means incorporated into the highpressure

control valve and arranged in series flow communication with said control valve and including;

a valve seat formed about an inlet opening of said control valve,

a valve spool having an inlet end and an outlet end with a flow communication passage therethrough for flow communication between said cylinder and said control valve and having said outlet end extending partially into the inlet opening to provide an individual fluid pressure chamber adjacent the flow outlet end and being isolated from said flow communication passage, said valve spool being preset to an open position relative to said valve seat permits a normal operative flow of gas to pass through said flow communication passage wherein said pressure chamber provides means to detect a defect in the high pressure control valve associated with predetermined loss of fluid from said pressure chamber and being responsive to such defect to activate said valve spool to move it from the open position to a closed position relative to said valve seat to block gas flow through the shutoff means.

4,077,423

HIGH PRESSURE GAS DISCHARGE VALVE DEVICE FOR SAFETY AIR BAGS

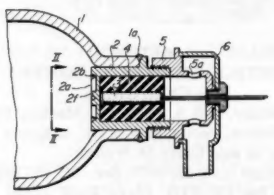
Takao Kasagi, Tokai; Satosi Kuwakado, Nishio, and Toshihiro Takei, Okazaki, all of Japan, assignors to Nippon Soken, Inc., Nishio, Japan

Filed Jan. 20, 1976, Ser. No. 650,752

Claims priority, application Japan, Feb. 4, 1975, 50-16631[U]

Int. Cl.² F16K *17/40;* B60R *21/08*

U.S. Cl. 137—68 A **2 Claims**



1. A high pressure gas discharge valve device of rupture type mounted at an opening portion of a high pressure gas container for supplying a high pressure gas to a safety air bag, comprising:

i. a sealing disk which constitutes a rupture wall portion disposed at said opening portion and is formed on at least one side of said rupture wall portion with a circular groove extending along the periphery of said disk and a plurality of radial grooves extending from said circular groove toward the center portion of said disk in such a manner that a thick ungrooved portion remains at said center portion; and

ii. explosion means for producing an explosive force which is applied to said sealing disk for rupturing said sealing disk, said explosion means having one detonator so arranged that the longitudinal center axis thereof intersects said thick ungrooved portion in said sealing disk and that the whole exploding-end surface of said detonator is substantially covered by said thick ungrooved portion in said sealing disk.

4,077,424

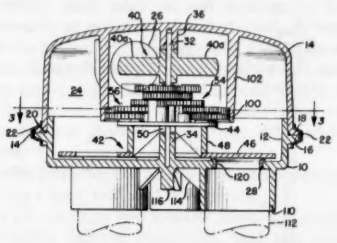
LIQUID DISTRIBUTOR VALVE ASSEMBLY

Gordon F. Ehret, Alhambra; William N. Rowley, Palos Verdes Estates, and Robert R. Williams, San Dimas, all of Calif., assignors to Wylain, Inc., Dallas, Tex.

Filed Nov. 18, 1976, Ser. No. 743,147

Int. Cl.² F16K *11/02*

U.S. Cl. 137—119 **9 Claims**



1. A liquid distributor valve assembly for selectively directing liquid from a source to a plurality of delivery conduits, said system comprising a housing having an inlet for receiving liquid from said source, a plurality of outlets adapted for connection to said conduits, and a chamber communicating said inlet and said outlets; impeller means disposed in said chamber in the path of the liquid entering the housing through said inlet, said impeller means being rotatable in said housing by the force of said liquid; valve means for moving in said chamber in a manner to control the flow of fluid through said outlets; and two gear systems responsive to movement of said impeller means for moving said valve means, said gear systems operating independently of each other to reduce the driving torque applied through each system.

4,077,425

FLUID FLOW CONTROL DEVICES

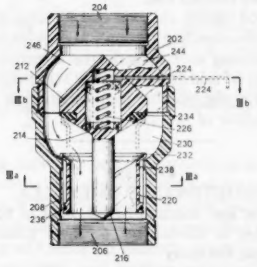
Mordeki Drori, 89 Zahal, Kiron, Israel

Filed Jun. 14, 1973, Ser. No. 369,978

The portion of the term of this patent subsequent to Mar. 7, 1994, has been disclaimed.

Int. Cl.² F16K *31/124*

U.S. Cl. 137—219 **7 Claims**



1. A fluid flow control device, comprising: a housing having an inlet and an outlet joined by a passageway, said passageway including a cylindrical chamber having an inwardly extending annular shoulder at the inlet end thereof; a sleeve axially movable within said cylindrical chamber to enlarge or restrict said passageway in order to control the fluid flow therethrough from the inlet to the outlet; said sleeve being formed with a plurality of outer axial ribs engageable with said inwardly extending annular shoulder for guiding the movement of the sleeve; a cylinder fixed to the housing; a piston movable within the cylinder and connected to the sleeve to move same there-

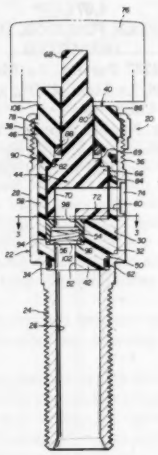
with for controlling the fluid flow through said passageway; a spring between the cylinder and piston biassing the piston outwardly of the cylinder to move the sleeve to enlarge said passageway; a first annular sealing element fixed to said cylinder in position to be engaged by one end face of the sleeve when moved to one extreme position; and a second annular sealing element fixed on the outer surface of the opposite end of the sleeve and engageable with said inwardly extending annular shoulder of the housing when the sleeve is in said one extreme position, said passageway thereby being closed by both ends of said sleeve when moved to said one extreme position.

4,077,426

FAUCET VALVE AND VALVE CARTRIDGE

Earl K. Karie, Detroit, Mich., assignor to Brass Craft Manufacturing Company, Detroit, Mich.

Filed Mar. 28, 1977, Ser. No. 782,120
Int. Cl.[2] F16K *25/00*
U.S. Cl. 137—454.6 **10 Claims**



1. A faucet valve, comprising:

a metal housing having a concentric axial bore including an internal annular shoulder,

a cylindrical stationary plastic valve member within said housing on said shoulder having an axially off-set inlet bore and an enlarged outlet counterbore coaxially aligned with said inlet bore,

a rotatable cylindrical plastic valve member within said housing having a body portion rotatably engaging said stationary valve member including the opening to said counterbore having an inlet port equally offset and alignable for communication with said stationary member outlet counter bore, a transverse outlet port communicating with said inlet port and said rotatable valve member having an integral axially projecting stem portion,

an annular resilient sealing member within said stationary valve member counterbore resiliently biased against said rotatable valve member, sealing the communication between said stationary and rotatable valve member, and

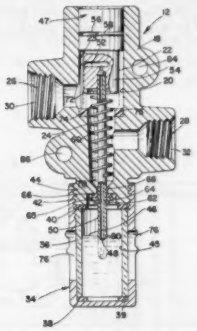
an annular plastic closure member within said housing received over said rotatable member portion, retaining said rotatable member within said housing.

4,077,427

LEAK DETECTOR VALVE ASSEMBLY

Jose Rosan, Jr., Newport Beach, and Marvin P. Reece, Dana Point, both of Calif., assignors to Rosan Enterprises, Newport Beach, Calif.

Filed Sep. 9, 1976, Ser. No. 721,839
Int. Cl.[2] 116 *114 P*; F16K *37/00*
U.S. Cl. 137—551 **6 Claims**



1. A fluid leak detector valve assembly having a body providing an internal cavity defined by an upper internal chamber and a lower internal chamber, the upper chamber having an inlet port and the lower chamber having an outlet port;

container means containing liquid means attached to the body, the space above the liquid means communicating with the lower internal chamber and the outlet port;

said inlet and outlet ports being interconnected through said upper and lower internal chambers;

a normally open plunger means positioned in said upper chamber and being axially displaceable within said upper chamber so that in the closed or test position it substantially closes to fluid communication said body between said inlet and outlet ports;

said plunger means being provided with bleeder means and an elongated tubular means interconnected therewith for conducting fluid through said plunger means in the closed or test position;

an end of said tubular means being below the surface of the liquid in the test or closed position so that the passage of gaseous fluids will create bubbles in said liquid;

means engaging said plunger means for returning said plunger means to a normally open position providing for flow communication between said ports; and

wherein the improvement thereof comprises;

a sealing means connected to said tubular means for slideable displacement therewith, whereby said lower internal chamber is sealed from said container means when said plunger means is in a normally open position; and

a beveled end on the end of the tubular means that is submerged in the liquid, such beveled end culminating in an annular knife edge.

4,077,428

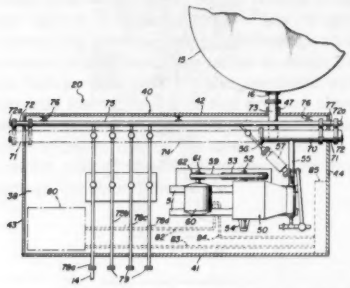
TRANSPORTABLE WATER INJECTION PLANT

Dale L. Weaver, Worland, Wyo., assignor to Dale Weaver, Inc., Worland, Wyo.

Filed Jan. 29, 1976, Ser. No. 653,520
Int. Cl.[2] F04B *17/06*
U.S. Cl. 137—567 **11 Claims**

1. A transportable water injection plant for injecting water into an underground formation penetrated by a water injection well, said water injection plant comprising a free-standing transportable foundation adapted to be moved to and from a water injection well site and to rest upon the ground thereat in a self-supporting condition, pumping mechanism mounted on

said foundation and having a water inlet and a water outlet and operable for moving water under pressure from said water inlet to said water outlet, intake conduit means mounted on said foundation and coupled to said water inlet and adapted to be readily detachably coupled to an associated source of water for receiving water therefrom, discharge conduit means mounted on said foundation and coupled to said water outlet, means for detachably coupling said discharge conduit means to an associated water injection well for injecting water into the underground formation, control means carried by said foundation and coupled to said pumping mechanism for controlling



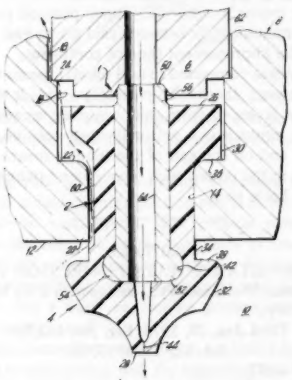
the operation thereof, a housing mounted on said transportable foundation and cooperating therewith to enclose said pumping mechanism and said intake and discharge conduit means and said control means, said housing defining a work chamber dimensioned to permit a workman to walk therein for servicing and operating the contents of said housing, and closable access means in said housing to permit a workman to enter and exit said work chamber, and connection means carried by said foundation for readily detachably connecting said pumping mechanism and said control means to an external source of power for operation of said water injection plant.

4,077,429

PUSH-FIT INLET VALVE ASSEMBLY

Everett L. Kimball, Wilmington, Del., assignor to Ronson Corporation, Bridgewater, N.J.

Filed Dec. 23, 1976, Ser. No. 754,037
Int. Cl.² F16K *24/00*
U.S. Cl. 137—588 **20 Claims**



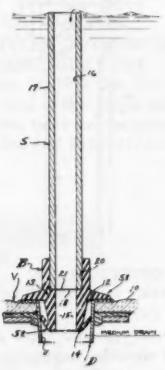
1. An inlet valve assembly comprising, in combination, a valve member formed of a flexible material, and a stem formed of a rigid material and fitted into said valve member, said valve member having a first end, a second end spaced from said first end, and a generally cylindrically shaped outer wall surface extending between said first and second ends, said wall surface having a first annular shaped protuberance adjacent said first end, a second annular shaped protuberance adjacent said second end, and an annular recessed portion relative to said first and second protuberances extending between said first and second protuberances, said valve member having a bore extending therethrough from said first end toward said second end, the bore terminating at a location intermediate said second end and the adjacent end of the annular recessed portion of said wall surface, said valve member having a normally closed slit therein extending between the second end thereof and the adjacent end of said bore, said stem being axially elongated and having a first end and a second end spaced from said first end with a bore extending axially therethrough between said first and second ends thereof, said second end of said stem being positioned within the bore in said valve member and the first end of said stem being spaced from the second end thereof in the direction toward the first end of said valve member, the bore in said stem opening into the bore in said valve member, and a groove formed inwardly into the annular recessed portion of said wall surface and extending in the axial direction of the bore through said valve member from a point adjacent said second protuberance to said first protuberance and extending axially in the outer surface of the first protuberance for at least a part of the axial length thereof.

4,077,430

STANDPIPE ADAPTER FOR SINK DRAINS OF VARIED DIAMETER

Jerome D. Brown, 3237 Par Dr., La Mesa, Calif. 92041, and John W. Mansfield, La Mesa, Calif., assignors to Jerome D. Brown, La Mesa, Calif.

Continuation of Ser. No. 515,585, Oct. 17, 1974, abandoned.
This application Jun. 4, 1976, Ser. No. 692,979
Int. Cl.² F17D *1/00*
U.S. Cl. 137—593 **8 Claims**



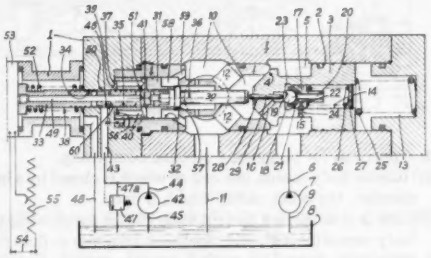
1. An adapter for sealed engagement of a radially movable standpipe with sink bottom drains of varied diameter cylinder opening disposed on fixed vertical axes, and including; a conical and downwardly tapered tubular base element of rubber-like material with a top at least smaller and a bottom substantially smaller in diameter than the cylinder opening of the drain into which it is inserted and with a flow passage opening therethrough, an upwardly open receptacle in a boss integral with and projecting upwardly from the top of the base to move therewith and in open communication with the flow passage, a tubular standpipe received in the receptacle and with a passage continuation of the base passage, an uppermost seal comprised of a flexible peripheral flange integral with and projecting radially from the top of the base element to overlie and supportably engage upon a surrounding area of the sink bottom, and a lowermost seal comprised of a flexible and radially depressible peripheral flange integral with and projecting radi-

ally from the bottom of the base element and having continuous circumferential engagement within the cylinder opening when axially aligned with the said cylinder opening and also when axially misaligned therewith and thereby permitting lateral radial movement of the standpipe relative to the sink bottom drain without breaking sealed engagement.

4,077,431
SERVO-OPERATED REGULATOR VALVE

Louis Emile Martin, Senlis, and Antoine Theodore Mauboussin, Montfermeil, both of France, assignors to Societe Anonyme Poclain Hydraulics, Verberie, France

Filed Oct. 14, 1976, Ser. No. 732,435
Claims priority, application France, Oct. 22, 1975, 75 32371
Int. Cl.[2] F16K *11/00*; F15B *13/044*
U.S. Cl. 137—596.14 **3 Claims**



1. A fluid regulator valve comprising:

a valve body defining a valve seat;

a main valve capable of bearing against the seat and defining in the body an inlet chamber for inlet of a fluid under pressure, an exhaust chamber which as a function of its position the main valve puts into direct communication with or isolates from the inlet chamber, and a control chamber for control of the position of the main valve capable of containing a fluid the pressure of which has an effect tending to keep the main valve bearing against its seat;

an auxiliary valve interposed between the control chamber and the exhaust chamber and movably with respect to the main valve;

an operating jack the piston of which defines a master chamber and which, when the master chamber is fed with an operating fluid, sets in motion the opening of the auxiliary valve to which it is coupled; means defining and operating chamber for containing an operating fluid; and

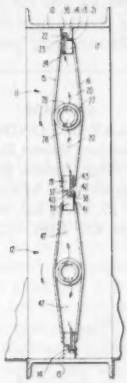
an operating regulator which selectively puts the master chamber in communication wih the operating chamber or with a tank of fluid not under pressure, the arrangement being such that when the auxiliary valve is in its closed position the inlet chamber and the control chamber are in communication and when the auxiliary valve is in its open position, the control chamber and the exhaust chamber are in communication and said communication between the inlet chamber and the control chamber is blocked.

4,077,432
PURGED VALVE

Leroy E. Herr, Allentown, Pa., assignor to Mosser Industries, Inc., Bethlehem, Pa.

Filed Jan. 5, 1977, Ser. No. 757,096
Int. Cl.[2] F16K *1/226*
U.S. Cl. 137—601 **19 Claims**

1. A valve assembly having a frame with a fluid flow opening therethrough; at least one blade mounted in the frame opening to be movable from a valve open position, in which fluid is able to flow through the frame opening, to a valve closed position, in which fluid is blocked from flowing through said frame opening, said blade having opposing upstream and downstream surfaces, an interior chamber lying between said surfaces, and edge portions joining said surfaces together; a first seat member carried by at least one of said edge portions, said first seat member including a substantially flat first rigid surface along its length and also a leaf spring along its length, the leaf spring being spaced apart from, and protruding beyond, the first rigid surface; a second seat member carried either by an interior wall of the frame or by the edge portion of an adjacent blade, said second seat member including a substantially flat second rigid surface along its length, and also a substantially flat seating area along its length, the seating area being spaced apart from the second rigid surface; said first and second seat members being so constructed and arranged that

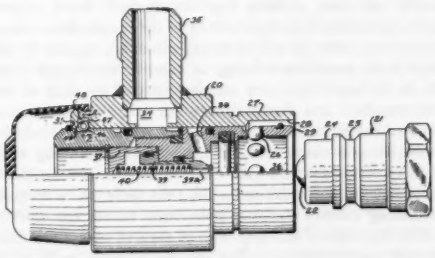


when the blade is in the valve closed position the flat, rigid surfaces rest face-to-face against each other and the end of the protruding portion of the leaf spring is urged against the seating area, blocking the flow of fluid around the blade and defining an enclosed cavity between the seat members, said cavity lying between said protruding portion of the leaf spring and said flat rigid surfaces and extending substantially the entire length of the seat members; and passageway means for carrying fluid under superatmospheric pressure, from a source external to said frame, through the interior chamber of said blade and into the enclosed cavity that is formed by the first and second seat members when the blade is in the valve closed position.

4,077,433
QUICK COUPLING DEVICE

Ojars Maldavs, Lincoln, Nebr., assignor to The Bruning Company, Lincoln, Nebr.

Filed May 17, 1976, Ser. No. 687,001
Int. Cl.[2] F16L *37/28*
U.S. Cl. 137—614.04 **16 Claims**



1. A quick coupling device for coaction with a check valve-equipped male device comprising

a generally cylindrical housing having an axially extending bore open at one end for receipt of said male device and having a radially extending passage communicating with said bore, said housing being closed to fluid flow at the at the other bore end,

a source of pressure fluid connected to said radially extending passage,

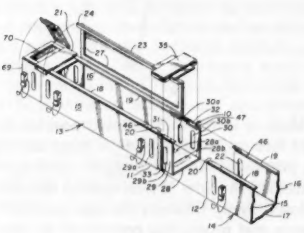
a spool slidably mounted in said bore and equipped with means for initially contacting said check valve in a first spool position and for maintaining said check valve open and establishing an L-shaped through conduit in a second spool position for flow from said source to said male device, and fluid pressure responsive means within said spool to assist opening and for maintaining said check valve open during reverse fluid flow from said male device to said radially extending passage.

4,077,434

SEALED LAY-IN CONDUIT DUCT

Edgar W. Sieckert, Princeton; Robert D. Frayseth, Minneapolis, and John R. Breckenridge, Anoka, all of Minn., assignors to Federal Cartridge Corporation, Minneapolis, Minn.

Filed May 27, 1976, Ser. No. 690,512
Int. Cl.² F16L *9/22*
U.S. Cl. 138—92 **20 Claims**



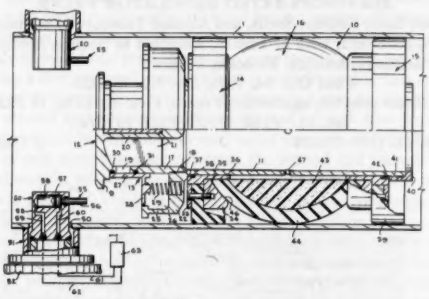
1. A sealed conduit system for electrical conductors including a plurality of duplicate open end sheet metal duct sections, each of said sections having a substantially U-shaped, imperforate trough body member with adjacent open end portions having abutting ends defining a line of juncture therebetween and a movable sealing trough cover, the open side of the U of each of said sections being unobstructed throughout the length of the section, connecting sealing collar members extending into and joining the adjacent end portions of said duct sections, said collar members having at least side and bottom walls, said side walls having free upper ends defining an opening therebetween, cooperative interengaging rib and groove elements carried by said walls of said collar members and the adjacent ends of said duct sections within which the said collar member extends and is disposed entirely, said elements cooperatively securing said duct sections together in rigid, fixed, aligned relation and extending transversely of the longitudinal axis of said sections, those of said elements which are carried by said trough body members defining an imperforate trough therewith an oil impervious seal member carried by each of said collar members and disposed between said side and bottom walls and the adjacent end portions of the said duct sections into which said collar member extends and extending along both sides of and over the entire line of juncture of the adjacent ends of said duct sections and sealing the same, and a cooperative sealing closure member positioned across the opening between the ends of said side wall of each of said collar members and cooperatively sealing off the adjacent ends of the covers of said adjacent duct sections to effectively and cooperatively seal each of the sections throughout their length and to each other.

4,077,435

PIPELINE PLUGGING APPARATUS

Davis A. Van Scoy, Houston, Tex., assignor to Willard A. Sawyer, Tulsa, Okla.

Continuation of Ser. No. 397,262, Sept. 14, 1973, abandoned.
This application Jan. 19, 1976, Ser. No. 650,010
Int. Cl.² F16L *55/12*
U.S. Cl. 138—93 **15 Claims**



1. Apparatus for plugging a pipeline comprising:

(a) tubular body means, one end of which is closed by a head member, the other end of which is open;

(b) seal means carried by said body means for moving said body means through said pipeline in response to fluid flow therethrough and for sealing between said body means and said pipeline;

(c) ports through the walls of said tubular body means between said head member and said seal means for providing fluid communication between a portion of said pipeline downstream of said seal means and a portion upstream of said seal means;

(d) valve means carried by said body means and including a cylindrical sleeve member sealingly engaging the exterior of said body means between said head member and said seal means and movable between a first position in which said ports are sealingly closed by said sleeve member and a second position in which said ports are opened, said cylindrical sleeve member having equal and balanced pressure areas at its opposite ends so that pressure forces acting on said sleeve member, in upstream and downstream directions, regardless of any differential pressure between said upstream and downstream portions of said pipeline, are substantially equal whether said valve is in said first or second positions; and

(e) stop means extendable into said pipeline and operable externally thereof to arrest movement of said body means through said pipeline and to engage said valve means for moving said sleeve member between said first and second position, said first position permitting any differential fluid pressures which may exist between said downstream and upstream pipe portions to expand said seal means, providing fluidtight sealing engagement of said seal means with inner walls of said pipeline.

4,077,436

PORTABLE HAND WEAVING LOOM

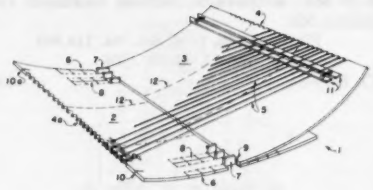
Jules Kliot, 2150 Stuart St., Berkeley, Calif. 94705

Filed May 19, 1977, Ser. No. 798,424
Int. Cl.² D03D *29/00*
U.S. Cl. 139—34 **3 Claims**

1. A loom including

Two normally rigid flat base elements capable of being folded along lateral axes and, adapted to be joined in any of several positions, together forming a single flexible base

adapted to receive warp yarn so as to be bowed along a longitudinal axis having front and back surfaces so that



the tendency of the base to return to a normal flat condition applies tension to the warp.

4,077,437

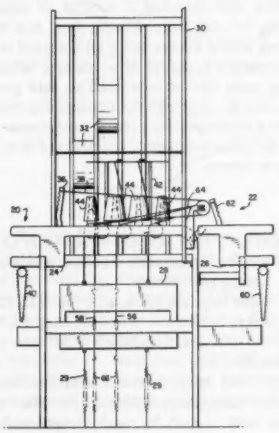
APPARATUS FOR FORMING A DOUBLE CATCH THREAD NARROW WEAVE

Junior C. Spence, Stuart; Robert J. Rorrer, Woolwine, and James L. Holt, Stuart, all of Va., assignors to J. P. Stevens Co., Inc., New York, N.Y.

Division of Ser. No. 527,438, Nov. 26, 1974, Pat. No. 4,004,617. This application Nov. 1, 1976, Ser. No. 737,625

Int. Cl.[2] D03D *49/50, 35/00*

U.S. Cl. 139—116 **10 Claims**



1. A weaving apparatus for weaving a narrow fabric having a plurality of warp threads interwoven with a pair of catch threads and a shuttle thread comprising:

means positioning said warp threads between said pair of catch threads;

shed change means for raising and lowering said warp threads and said catch threads periodically at a first and second set of points in time in a cycle to weave;

shuttle means for carrying said shuttle thread through the warp threads to engage a catch thread and carry said catch thread into the warp threads; and

pay means for programmably paying out not more than the single catch thread engaged by said shuttle thread during a single cycle of said shed change means.

4,077,438

WEFT CUTTING DEVICE FOR LOOMS

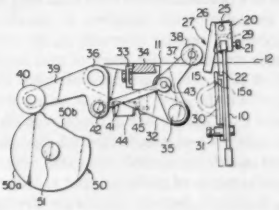
Shigenori Tanaka, Hachioji; Akio Tojo, Higashi-murayama; Akio Shindo, Fuchu, and Kimimasa Ohnishi, Tokyo, all of Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Nov. 23, 1976, Ser. No. 744,421

Claims priority, application Japan, Jun. 25, 1976, 51-83680

Int. Cl.[2] D03D *49/70*

U.S. Cl. 139—302 **9 Claims**



1. Weft cutting device for a loom having a crank shaft and a reed, comprising a scissor type cutter assembly including a fixed blade mounted on a front face of the reed and a movable blade having an upper end pivotally mounted on the reed in pressure contact with the side face of said fixed blade said movable blade being preloaded by a spring to an open position, thread guide means for guiding a weft thread to a space between the fixed blade and the movable blade in said open position, and pressure applying means in front of the movable blade and movable in relation with the movement of the reed for applying a pressure to said movable blade to urge same to a closed position in which the weft thread is cut off.

4,077,439

FIXING DEVICE FOR ELECTRICAL AND ELECTRONIC COMPONENTS

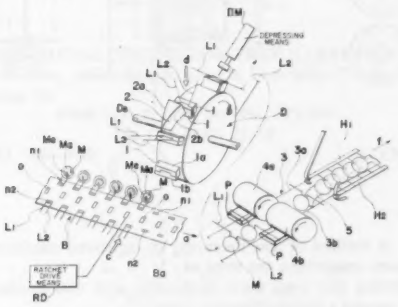
Mituro Hamuro, Nagaokakyo; Tsuneo Taki, Hakui, and Yasuhiro Tsuino, Nagaokakyo, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Oct. 27, 1976, Ser. No. 736,183

Claims priority, application Japan, Oct. 29, 1975, 50-130787

Int. Cl.[2] B21F *45/00*

U.S. Cl. 140—1 **2 Claims**



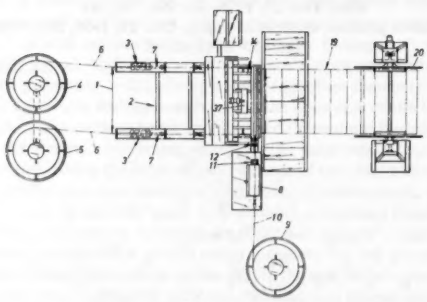
1. A fixing device for successively fixing a plurality of electronic components held on first holding means onto second holding means, which device comprises means for transporting, in one direction, the first holding means on which the plurality of electronic components are each held with the lead wires thereof extending outwardly in a direction parallel to each other from the main body of the electronic component, removing means adjacent the path of transport of said first holding means for sequentially removing the electronic components from said first holding means, shaping means for receiving and holding the components from said removing

means and shaping the lead wires of the thus removed electronic component held in said shaping means so that they are bent outwardly away from each other in directions normal to said parallel direction, stretching means for receiving components from said shaping means and stretching the thus shaped lead wires into a straight line, and means for successively mounting the electronic components having the thus stretched lead wires onto the second holding means, said electronic components being so arranged on said second holding means as to be directed in a predetermined direction, said shaping means including a rotatable drum member, a plurality of holding members disposed at regular intervals on the outer periphery of said rotatable drum member, each of said holding members having a pair of jaws which are movable back and forth from a position in which they are in contact to a position in which they are spaced from each other in timed relation to the movement of said removing means, a tapered member fixedly disposed adjacent said drum member after said removing means in the direction of rotation of said drum and radially outwardly of said holding members having outwardly diverging surfaces over which the lead wires of the electronic components are moved to diverge them into a V-shape as the electronic components held in said holding members move during rotation of said rotatable drum member, and depressing means movably disposed radially outwardly said drum member and after said tapered member in the direction of rotation of said drum for engaging the lead wires and further diverging them into approximately a straight line.

4,077,440
REINFORCEMENT ELEMENTS FOR ELONGATE CONCRETE BUILDING BLOCKS MANUFACTURED BY SLIDING FORM CASTING AND A METHOD AND A MACHINE TO PRODUCE SUCH ELEMENTS

Thony Göte Lidström, Molndal, Sweden, assignor to Nilcon Engineering AB, Kallered, Sweden

Filed Nov. 3, 1975, Ser. No. 627,938
Int. Cl.² B21F *27/04*
U.S. Cl. 140—105 **10 Claims**



1. A method of manufacturing an improved reinforcement element comprising the steps of

feeding two steel wires in parallel with one another and spaced a certain distance apart,

feeding transverse crosswise wire rods having a length exceeding the distance separating said two longitudinal wires towards and against said longitudinal wires so as to allow both ends of said crosswise wire rods to extend beyond said longitudinal wires and to ensure that said crosswise wire rods will be positioned at a certain mutual distance from one another,

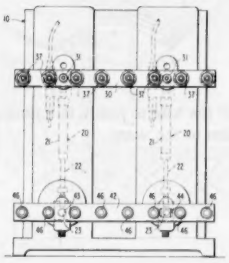
bending said ends of said crosswise wire rods about said longitudinal wires, and

striking said bent ends with sufficient force to permanently compress the portion of the encircled longitudinal wire to effect a mechanical interlock therewith.

4,077,441
CONVERTIBLE FILLING MACHINE

Sidney Rosen, Baltimore, and Richard Nelson Bennett, Arbutus, both of Md., assignors to National Instrument Company, Baltimore, Md.

Filed Aug. 16, 1976, Ser. No. 714,903
Int. Cl.² B65B *3/04*
U.S. Cl. 141—1 **19 Claims**



1. A filling machine, for a predetermined number of filling units mounted thereon, each including pump means having two ends, one of which is actuatable, each pump means comprising pump cylinder means and pump piston means connected with piston rod means, and separate actuating drive means on the same side of the machine for the filling units of the same side, characterized in that for purposes of increasing the number of filling stations on the same filling machine, the respective separate drive means of the same side are drivingly interconnected by a linking bar carrying a predetermined number of bearing sleeve means corresponding in number to the desired increased number of filling units to be used on the same side, a mounting bar detachably connected with said filling machine and carrying a number of pump post means corresponding to said increased number, and the linking bar and its bearing sleeve means being all actuated in unison by the thus interconnected separate drive means, whereby the number of filling units can be increased to said predeterimed increased number by operatively connecting one end of each filling unit to a corresponding pump post means on the mounting bar and the other actuatable end thereof to a corresponding bearing sleeve means.

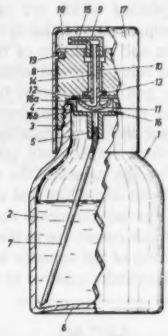
4,077,442
ARRANGEMENT IN LIQUID SPRAYER CONTAINERS

Sigfrid M. Olofsson, Munkedal, Sweden, assignor to AB Malte Sandgren, Sandared, Sweden

Filed Sep. 13, 1976, Ser. No. 722,726
Claims priority, application Sweden, Aug. 10, 1976, 7608916
Int. Cl.² B67D *5/54*
U.S. Cl. 141—20 **18 Claims**

1. An improved spray arrangement for liquid containers such as bottles comprising a closure for the bottle, a nozzle supported at least in part by said closure and having a discharge opening, a cap surrounding said closure and defining a space therebetween, said cap being movable relative to said closure for compressing air contained in said space, passage means interconnecting said space with the interior of said bottle and interconnecting the portion of said bottle containing the contents thereof with said nozzle discharge opening, and valve means for controlling the communication through said passage means, said valve means being adapted to open communication between said space and said bottle upon the generation of a pressure upon compression of air in said space for permitting said compressed air to be transferred to the portion of said bottle above its contents, said valve means being adapted to close communication of said space through said passage means when the pressure of the air in said space and the portion of said bottle above its contents are substantially equal, said valve means, upon removal of said cap being manu-

ally operable for movement to an open position for permitting discharge of the contents of said bottle through said nozzle



discharge opening under the influence of the pressure of the compressed air in said bottle above its contents.

4,077,443

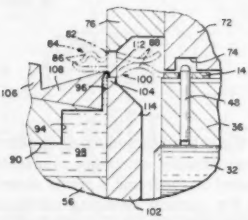
SOLDER RESIST APPLYING MACHINE

James Ray Coller, Mechanicsburg, and Suel Grant Shannon, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 324,729, Jan. 18, 1973, abandoned. This application Oct. 4, 1976, Ser. No. 729,548

Int. Cl.[2] B05C *7/00*

U.S. Cl. 141—111 **4 Claims**



1. Apparatus for applying solder resistive fluid in discrete quantities to a plurality of serially arranged electrical contacts without a need for masking, comprising:

a fluid reservoir containing a supply of fluid material,

dispensing means adjacent said reservoir for transferring discrete quantities of fluid material from said fluid reservoir to a plurality of electrical contacts serially transported to said dispensing means,

drive means for transporting said electrical contacts serially to said dispensing station,

fluid supply means for supplying fluid material to said reservoir, thereby replenishing the discrete quantities of fluid transferred to said electrical contacts, and

adjustable flow regulating means for controlling the rate at which fluid is replenished from said fluid supply means to said reservoir,

said dispensing means including a fluid dispensing elongated channel along which said electrical contacts are transported by said drive means,

said dispensing means being filled with said fluid material and forming an elongated droplet of fluid material which is lengthwise of said channel and which is raised outwardly of said channel by fluid surface tension,

one lengthwise side of said channel having means operatively associated therewith for biasing said elongated droplet transversely whereby to impinge said contacts transported serially along said channel.

4,077,444

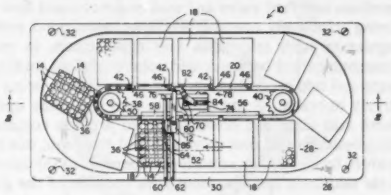
FRACTION COLLECTOR

Warren E. Gilson, 4801 Sheboygan Ave., and Robert E. Gilson, 4 Franklin Ave., both of Madison, Wis. 53705

Filed Feb. 12, 1975, Ser. No. 549,361

Int. Cl.[2] B65B *43/60*; G01N *1/10*

U.S. Cl. 141—130 **9 Claims**



1. A fraction collector comprising in combination:

housing means including a stationary generally horizontal surface,

a flexible endless member,

means mounting said endless member for movement around a closed loop above said surface;

a plurality of racks slidably resting on said surface;

each rack including structure for supporting at least one row of liquid containers;

means releasably interconnecting said racks to spaced points along said endless member;

first drive means for advancing said endless member in order to slide said racks around a closed path on said surface adjacent said loop;

head means adapted to support a liquid conduit;

support means for supporting said head means for movement along a line above said racks intersecting said path;

second drive means for moving said head means along said line; and

control means for operating said first and second drive means in increments for advancing said rows in sequence beneath said support means and for moving said head means in increments along said rows.

4,077,445

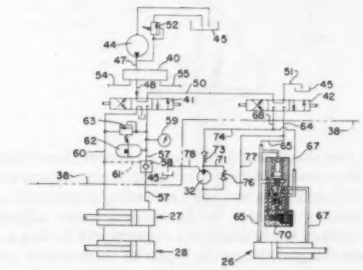
HYDRAULIC CIRCUIT FOR TREE HARVESTER

Leon A. Wirt, Joliet, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Apr. 2, 1976, Ser. No. 673,186

Int. Cl.[2] A01G *23/08*

U.S. Cl. 144—3 D **10 Claims**



1. A hydraulic control circuit for use in a tree harvesting machine having a shear assembly operated by double acting hydraulic motor means, a delimbing assembly, a drive mecha-

nism operated by hydraulic motor means for moving a tree past the delimbing assembly, and a grapple arm operated by double acting hydraulic motor means for urging the tree into engagement with the drive mechanism and the delimbing assembly, comprising:

a source of fluid under pressure and a fluid reservoir;

a main fluid line having an upstream end in communication with said source of fluid under pressure and a downstream end in communication with said reservoir;

a first control valve disposed along said main line intermediate said source of fluid under pressure and said reservoir; and

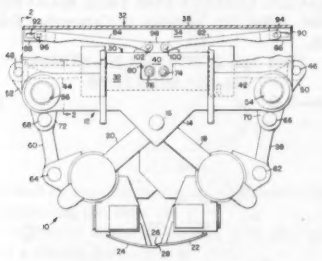
a second control valve disposed along said main line intermediate said first valve and said reservoir, said first valve being selectively operable to communicate said main line upstream with said main line downstream to provide communication between said source of fluid under pressure and said second valve, said second valve being selectively operable to communicate said main line upstream with said main line downstream to provide communication between said first valve and said reservoir, one of said valves being further selectively operable to (a) communicate said main line upstream with one side of the grapple arm motor means and simultaneously communicate said main line downstream with the other side of the grapple arm motor means to actuate the grapple arm and (b) communicate said main line upstream with said other side of the grapple arm motor means and simultaneously communicate said main line downstream with said one side of the grapple arm motor means to retract the grapple arm, the other of said valves being further selectively operable to (a) communicate said main line upstream with one side of the shear motor means and simultaneously communicate said main line downstream with the other side of the shear motor means to actuate the shear assembly and (b) communicate said main line upstream with said other side of the shear motor means and a port of the drive motor means and simultaneously communicate said main line downstream with said one side of the shear motor means and another port of the drive motor means to retract the shear assembly and actuate the drive mechanism.

4,077,446

TREE SHEAR ACTUATOR RESTRAINT SYSTEM

Andrew Paul Redman, and Gary Lee Schulte, both of Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 7, 1977, Ser. No. 774,763
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 E **6 Claims**



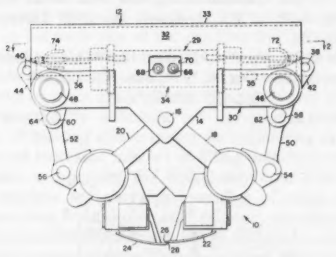
1. In a tree shear head including a support frame defining a horizontal transverse actuator housing having opposite ends, a pair of horizontal longitudinally extending crankshafts respectively rotatably mounted in the support frame adjacent the opposite ends of the housing and respectively having a pair of crank arms integral therewith, a pair of shear blades mounted on the frame for vertical swinging movement toward and away from each other about a horizontal longitudinal axis located below and equidistant from the crankshafts, a pair of drive links respectively connecting the crankshaft to the pair of shear blades, a hydraulic actuator located in the housing and having a cylinder from the opposite ends of which respectively project a pair of piston rods having respective outer ends connected to the pair of crank arms and having respective inner ends carrying pistons which are each adapted to be slectively pressure-reciprocated in the cylinder for effecting simultaneous extension and retraction of the piston rods and said pair of crank arms being disposed to the crank shafts such that during extension and retraction of the piston rods the cylinder will rise and fall, the improvement comprising: a cylinder restraint means including rigid link means; first and second connection means respectively pivotally connecting the opposite ends of the link means to the cylinder and to the support frame; and at least one of the first and second connection means including lost motion means accommodating endwise movement of the link means due to the rise and fall of the cylinder during operation of the actuator but preventing endwise movement of the cylinder relative to the frame.

4,077,447

TREE SHEAR ACTUATOR RESTRAINT SYSTEM

Warren Lynn Thompson, Galena, Ill., and Lynn Edward Kurt, Dubuque, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Mar. 7, 1977, Ser. No. 774,871
Int. Cl.² A01G *23/08*
U.S. Cl. 144—34 E **5 Claims**



1. In a tree shear head including a support frame, a pair of horizontal longitudinally extending crankshafts respectively rotatably mounted on the frame, a pair of shear blades mounted on the frame for vertical swinging movement toward and away from each other about a horizontal longitudinal axis located below and equidistant from the crankshafts, a pair of links respectively connecting the crankshafts to the pair of shear blades and a hydraulic actuator having a cylinder from the opposite ends of which respectively project a pair of piston rods having respective outer ends connected to the pair of crank shafts, the improvement comprising: a cylinder restraint means including first and second flexible members respectively connected between the frame and opposite end portions of the cylinder for restraining the cylinder from undergoing transverse and rotational movements relative to the piston rods.

4,077,448

IMPROVED EDGING SYSTEM

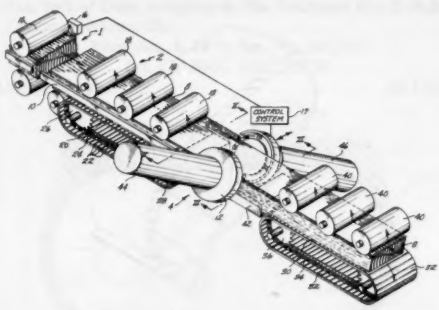
Earl D. Hasenwinkle, Longview; Ernesto M. Pangilinan, Seattle, and Frank Wislocker, Longview, all of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Dec. 31, 1975, Ser. No. 645,742
Int. Cl.² B27C *1/08*
U.S. Cl. 144—118 **10 Claims**

1. In an edging system of the type having a pair of substantially parallel, laterally spaced, adjustable cutter heads for machining the edges of an elongated workpiece moving longitudinally through and relative to the edging station, the improvement comprising:

means to adjust the lateral spacing between the cutter heads in response to the width of an incoming workpiece, and

means to adjust the angular orientation of the cutter heads with respect to a longitudinally extending, substantially



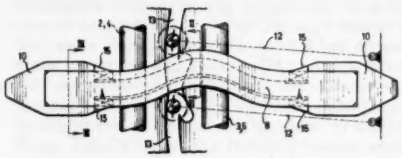
vertical reference plane while maintaining their substantially parallel relationship.

4,077,449

COPY MILLING MACHINE

Franciscus Jacobus Helmes, Tegelen, Netherlands, assignor to Helmes Machinefabriek B. V., Steyl, Tegelen, Netherlands

Filed Aug. 13, 1976, Ser. No. 714,137
Claims priority, application Japan, Aug. 29, 1975, 50-120310
Int. Cl.[2] B27C *5/00*; B43L *13/00*
U.S. Cl. 144—144 A 4 Claims



1. A copy milling machine for manufacturing products having a predetermined thickness comprising:

a pair of opposed milling cutters each having double profile portions with the largest diameter of each milling cutter positioned between the profile portions thereof;

said milling cutters being supported for movement toward and away from a central path extending therebetween;

a pair of rollers each for controlling the positioning of one of the milling cutters relative to the central path;

a template having opposed workpiece receiving zones each adapted to receive a workpiece having twice the predetermined product thickness;

a cover plate for retaining workpieces in the workpiece receiving zones of the template;

said template further including a pair of opposed profile edges for engaging the rollers and thereby controlling the positioning of the milling cutters relative to workpieces carried by the template;

the profile edges of the template diverging outwardly at portions thereof corresponding to the ends of workpieces carried by the template so as to disengage the milling cutters from the workpieces and thereby provide material bridges joining the opposite ends of otherwise separated workpieces formed by the copy milling machine; and

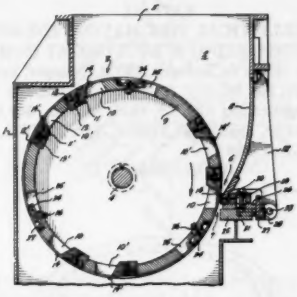
means for advancing the template, the cover plate and workpieces carried thereby along the predetermined path between the milling cutters.

4,077,450

ROTARY DRUM WASTEWOOD CHIPPER

Robert T. Ackerman, Seattle, Wash., assignor to Nicholson Manufacturing Company, Seattle, Wash.

Continuation of Ser. No. 643,520, Dec. 22, 1975, abandoned.
This application Jan. 17, 1977, Ser. No. 759,767
Int. Cl.[2] B27C *1/00*
U.S. Cl. 144—172 14 Claims



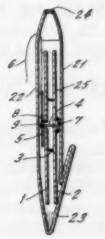
1. In a chipper including a chipping chamber, a chipping drum rotatably mounted in the chipping chamber and having an axial row of individual cutting bits and an anvil mounted in the chipping chamber adjacent to the periphery of the drum and cooperating with the individual cutting bits to form a chipping throat, the chipping drum having a periphery circumferentially corrugated to provide alternate ridges and grooves, the anvil being corrugated at the chipping throat with projections and notches generally complemental to the grooves and ridges of the corrugations of the chipping drum periphery and the corrugations of the chipping drum periphery and of the anvil being disposed in interfitting relationship, the improvement comprising an elongated evening knife having its length extending axially of the drum in a position trailing the row of individual cutting bits circumferentially in the direction of rotation of the drum, and means mounting said evening knife on the chipping drum with its cutting edge located to pass closely adjacent to the projections of the corrugate anvil as the drum is rotated.

4,077,451

EXPANDABLE BAG

Martin Zoland, 76 Raglan Street, Preston, Melbourne, Australia (3072)

Filed Dec. 23, 1976, Ser. No. 753,731
Claims priority, application United Kingdom, Dec. 13, 1976, 51953/76
Int. Cl.[2] A45C *7/00*
U.S. Cl. 150—31 7 Claims



1. An expandable bag having a closure;

and insert in said bag;

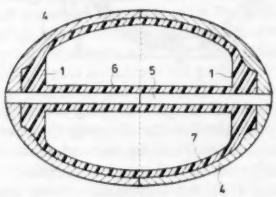
said insert comprising a pair of parallel sheet members;

A first means biasing said parallel sheet members apart;
A second means connected to said sheet members latching said sheet members against relative movement in response to said first biasing means;
And a third means connected to said second latching means adapted to move said latching means to a disengaged position in which said first biasing means may drive said sheet members apart within said bag.

4,077,452
WIDE ELLIPTICAL TIRE HAVING ENLARGED REINFORCING STRUCTURE AT HUB

Patrick Carn, Route de Benodet, 29000 Quimper, France

Division of Ser. No. 462,647, Apr. 22, 1974, Pat. No. 3,976,739. This application Aug. 29, 1975, Ser. No. 609,036
Claims priority, application France, Apr. 20, 1973, 73.15613; Apr. 4, 1974, 74 11994
Int. Cl.² B60C 5/12
U.S. Cl. 152—327 **3 Claims**



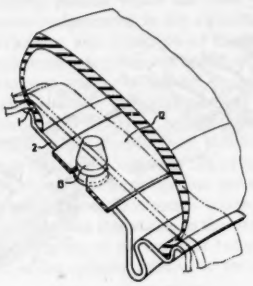
1. An inflatable, pneumatic, monobloc wheel which is wider than it is high, having a wide tread and having a cross-section taken through the axis which is elliptical, said wheel comprising
reinforcing means for the regions of strain concentration attributable to load and rolling,
the reinforcing means including a monobloc hub in the general form of a bobbin,
the hub consisting of a transverse tube uniting the lateral extremities of the wheel and providing a passage for a wheel axle, and
the tube having axially and radially enlarged portions at its ends, said enlarged portions extending radially substantially out to the tread and being axially integral with the transverse tube and radially integral with the tread,
all said elements of the inflatable monobloc wheel being formed essentially of polyvinyl chloride.

4,077,453
TIRE AND WHEEL ASSEMBLIES

Tom French; Reginald Harold Edwards, both of Sutton Coldfield, and Leslie Vernon Powell, Lichfield, all of England, assignors to Dunlop Holdings Limited, England

Division of Ser. No. 629,522, Nov. 6, 1975, which is a continuation of Ser. No. 150,522, Jun. 7, 1971, abandoned. This application Jun. 22, 1976, Ser. No. 698,532
Claims priority, application United Kingdom, Jun. 20, 1970, 30027/70
Int. Cl.² B60C 17/00
U.S. Cl. 152—330 L **28 Claims**

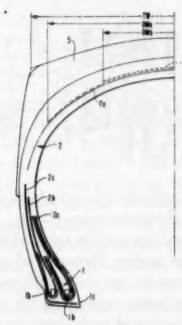
1. A pneumatic tire and wheel assembly capable of being run in a deflated condition comprising:
(a) a tire and a wheel upon which the tire is mounted to define therewith an inflation chamber, said wheel having a rim with a pair of opposed annular flanges and means for preventing the tire from becoming dislodged from the wheel when being run deflated, and
(b) a closed enclosing means comprising a completely closed but openable housing, attached to the rim of the wheel, containing lubricating material for the interior surfaces of the tire, which enclosing means releases the lubricating material onto the contacting interior surfaces of the tire when the assembly is used with the tire in a deflated condition to facilitate relative movement between the contacting interior surfaces of the tire.



4,077,454
PNEUMATIC TIRES SUITABLE FOR OFF-ROAD VEHICLES

Isao Miyoshi, Kodaira; Masaru Abe, Sayama; Toshiro Tezuka, Higashi-Murayama, and Toshio Yoshimoto, Akigawa, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

Filed Dec. 29, 1975, Ser. No. 645,141
Claims priority, application Japan, Dec. 28, 1974, 50-3822
Int. Cl.² B60C 9/10, 9/20
U.S. Cl. 152—354 R **4 Claims**



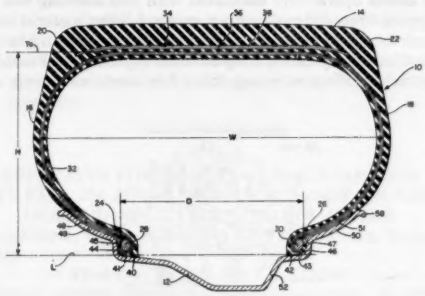
1. A pneumatic tire for off-road vehicles, comprising a multi-layered carcass composed of rubberized laminated ply layers, the cords of which are formed of organic fiber and inclined at an angle α selected in the range from 23° to 45° with respect to the equatorial line of the tire, the cords of approximately one-half of said carcass plies extending in an opposite direction to the cords associated with the remaining plies, and a breaker circumferentially superimposed about said multi-layered carcass, said breaker being composed of at least one rubberized layer each containing reinforcing elements, said reinforcing elements comprising a plurality of steel filaments having a tensile strength of at least 140 Kg/mm², said reinforcing elements inclined at an angle which is not more than 5° larger than a selected angle of said carcass cord and not more than 15° smaller than the selected angle of said carcass cord, and said breaker extending over 40 to 60% of the tread width and having a region located substantially at the center portion of the tread, whereby the tread cut resistance of said region is higher than that of the remaining region of the tread.

4,077,455

RADIAL PLY PNEUMATIC TIRE AND RIM ASSEMBLY

Walter W. Curtiss, Jr., Brimfield, and Joseph M. Forney, Akron, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Jan. 5, 1976, Ser. No. 646,714
Int. Cl.[2] B60C *9/02, 15/00*
U.S. Cl. 354 R 26 Claims



1. In a radial ply pneumatic tire and rim assembly;

a. a rim including a pair of spaced annular bead seat surfaces, a radially extending annular bead register surface extending generally radially outwardly from the axially outer edge of each bead seat surface, and an annular stabilizer flange surface extending generally axially outwardly from the radially outer edge of each annular bead register surface;

b. a pneumatic tire of the open-bellied type having a tread portion, a pair of sidewall portions, a pair of axially spaced apart bead portions each having an annular inextensible bead core, a carcass structure including at least one ply of inextensible cords extending continuously from one bead core to the other bead core and having a neutral contour line, and a circumferentially extending belt structure disposed circumferentially about said carcass structure; and

c. said carcass structure, when said tire is mounted on said rim and inflated to design operating inflation pressure, having its neutral contour line displaced by said stabilizer flange radially outwardly from the natural equilibrium curve of the carcass structure at least from a point just axially outwardly of a plane tangent to the axially outer surface of the bead core at least to the point of maximum axial width of the tire with no reversal of curvature of said carcass structure, and further characterized by the angle of the carcass structure with respect to a plane tangent to the axially outer surface of each bead at said plane being greater than 60°.

4,077,456

SIMPLIFIED VALVE FOR TUBELESS TIRE

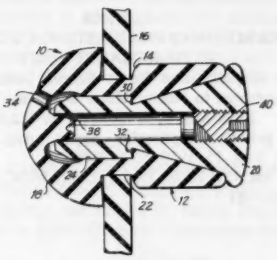
Joseph W. Smith, Altavista, Va., assignor to National Distillers and Chemical Corporation, New York, N.Y.

Filed Oct. 28, 1976, Ser. No. 736,289
Int. Cl.[2] B60C *29/00*
U.S. Cl. 152—427 3 Claims

1. A valve assembly adapted to be fitted in an opening provided in a tire rim, said valve assembly comprising:

a resilient rubber boot adapted to be inserted from one side of said rim within said opening, said boot having a bore extending therethrough; a head portion, at the inner end of the boot, having an outside diameter substantially greater than the diameter of the opening in said rim so as to set a limit on the outwardly directed movement of said boot, said head portion being provided with passageways integrally formed therein for communication with said bore; a neck portion having a diameter less than the head portion, and a skirt portion which in its relaxed or normal state possesses a variable outside diameter whose magnitude decreases from the adjoining neck portion to the outer end of said boot;

a rigid insert adapted to be inserted from the opposite side of said rim within the bore of said boot and to engage with a spherical protrusion at the interior of said head portion, said insert having a conical shape at its outer end and a cylindrical shape at its inner end, with a flange defined at



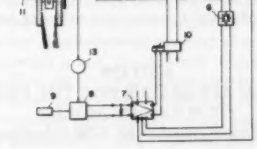
the point of transition; said flange engaging with a shoulder formed in the bore of said boot, the conical shape at the outer end of the insert being such as to provide an increasing diameter outwardly, thereby serving to deform the periphery of the resilient boot at its outer end and produce a well-defined groove abutting the opening in said rim so as to prevent inwardly directed movement of the valve assembly.

4,077,457

MOLTEN METAL POURING CONTROL METHOD AND APPARATUS FOR USE IN CONTINUOUS CASTING EQUIPMENT

Moriki Hashio, Kashima, and Toshio Terashima, Osaka, both of Japan, assignors to Sumitomo Metal Industries Limited, Osaka and Sumitomo Shipbuilding and Machinery Co. Ltd., Tokyo, Japan

Continuation of Ser. No. 448,712, Mar. 6, 1974, abandoned.
This application Jul. 28, 1975, Ser. No. 599,682
Int. Cl.[2] B22D *11/10*
U.S. Cl. 164—4 6 Claims



1. A method for controlling the pouring of molten metal from a tundish to a mold in a continuous casting process, comprising the steps of:

pouring said molten metal from a tundish nozzle having a variable slidable opening;

measuring the level of the molten metal in said mold;

comparing the level of the molten metal with a desired preset level in said mold;

varying the opening of said tundish nozzle in accordance with the difference between the measured level of the metal and said preset level in said mold;

detecting said tundish nozzle opening and providing an electrical signal representative thereof, and including providing said electrical signal with a component repre-

senting a desired minimum opening of said tundish nozzle to prevent the full closing thereof; and

providing said electrical signal to the input of a servo amplifier along with the difference between the measured level of molten metal and said preset level in said mold to provide a control signal for varying said tundish nozzle opening.

4,077,458

CORE AND METHOD FOR CASTING CYLINDER HEAD WITH EXHAUST PORT

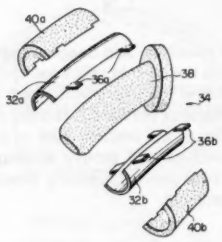
Yoshimasa Hayashi, and Kunio Sensui, both of Yokohama, Japan, assignors to Nissan Motor Company, Limited, Japan

Filed Aug. 5, 1976, Ser. No. 712,091

Claims priority, application Japan, Aug. 8, 1975, 50-110367[U]; Aug. 15, 1975, 50-112929[U]

Int. Cl.² B22D *19/00, 25/00;* B22C *9/10*

U.S. Cl. 164—11 **9 Claims**



1. A method of forming a cylinder head having an exhaust port passage in which a port liner is installed, comprising:

a. preparing a cured casting core made of a moulding sand;

b. covering said cured casting core circumferentially with a longitudinally segmented metal tube made as two semi-cylindrical segments thereby to form a first unit;

c. covering said first unit circumferentially with a longitudinally segmented cured casting core of lesser axial length than said metal tube end made as two semi-cylindrical sand segments made of a moulding sand thereby to form a second unit;

d. disposing said second unit in a mould;

e. casting molten metal around said second unit in said mould in the configuration of a cylinder head thereby securing the metal tube thereto; and

f. removing all the core from said second unit contained in the solidified metal forming said cylinder head.

4,077,459

METHOD AND APPARATUS FOR THE PRODUCTION OF FOUNDRY MOLDS

Erwin Bührer, Vogelingasschen 40, 8200 Schaffhausen, Switzerland

Filed Dec. 9, 1975, Ser. No. 639,047

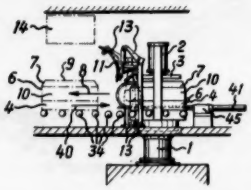
Claims priority, application Switzerland, Dec. 10, 1974, 16405/74

Int. Cl.² B22C *15/08*

U.S. Cl. 164—40 **23 Claims**

1. In a method for the producton of a foundry mold utilizing mold forming apparatus including a pattern device, a molding box arranged on said pattern device and a frame attached to said molding box wherein a surplus of molding material is initially filled in over said pattern device in excess of the amount required for the production of said mold and wherein only a single compression operation is effected the improvements comprising the steps of stripping said surplus molding material off with profiled stripper means after said molding material has been filled in and with said frame attached to said molding box, and subsequently performing said compression operation with said frame attached to said molding box.

10. Apparatus for the production of a foundry mold comprising a pattern device, a molding box arranged on said pattern device, a frame attached to said molding box, means operatively associated with said molding box for filling said molding box with molding material, said frame being arranged independently of said means for filling said molding box, stripper means operatively associated with said molding box for stripping from said molding box excess molding material introduced therein by said filling means, said stripper means having a profiled configuration adapted to be applied to said molding material to effect stripping thereof in conformity with said



profiled configuration, control means operatively associated with said stripper means for operating said stripper means to effect adjustment in the height thereof in accordance with a predetermined program, and feeder means operatively associated with one of said molding box and said stripper means and being adapted to effect relative movement between said stripper means and said molding box, the extent of said relative movement corresponding at least to the horizontal extension of said molding box in the direction of said relative movement, said profiled configuration of said stripper means being configured with a predetermined relationship relative to the shape of said pattern device thereby to effect stripping of said molding material according to the shape of the pattern device which is utilized in forming said mold.

4,077,460

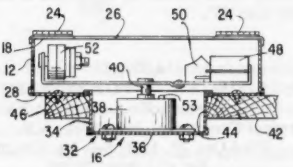
SAFETY SHIELD ASSEMBLY FOR CENTRIFUGAL CASTING APPARATUS

Richard J. Halatek, 2404 N. Cardinal Dr., Rolling Meadows, Ill. 60008

Filed Sep. 13, 1976, Ser. No. 722,413

Int. Cl.² B22D *13/00;* B29C *5/04;* F16P *1/02*

U.S. Cl. 164—152 **7 Claims**



1. For use in a table top a safety shield assembly encircling the rotational path of an arm driven by centrifugal casting apparatus and carrying a mold adapted to receive a charge of molten metal from a dish carried by said arm at a position spaced radially inwardly of said mold in response to the rotation of said mold, dish and metal along said path, the improvement comprising:

a shield wall encircling the rotational path of said arm carrying said mold, dish and metal,

a cover wall on said shield wall having a cover wall opening for enabling the manual application of heat to said charge and the manual control of said casting apparatus for rotating said arm,

said cover wall including a wall portion fixed to said shield wall, and a lid pivotally attached to said wall portion adjacent a diameter line of said ring wall and pivotable into a generally coincident relationship with said fixed wall portion,

support means secured to said shield wall and located at an axial position spaced from said cover wall to define a bottom opening substantially coincident with said cover wall opening,

and a cup shaped housing secured to said support means with said cup shaped housing having an open end communicating with said bottom opening and a mounting wall spaced from said open end for supporting said centrifugal apparatus.

4,077,461

APPARATUS FOR EFFECTING SIMULTANEOUS FREE-FALL JOLTING AND SQUEEZING OF FOUNDRY MOLDS DURING PRODUCTION THEREOF

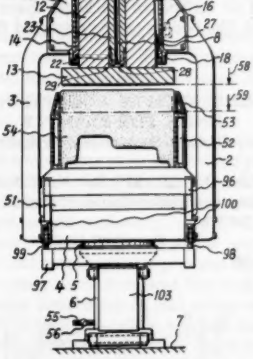
Erwin Bührer, Vogelingasschen 40, 8200 Schaffhausen, Switzerland

Filed Dec. 4, 1975, Ser. No. 637,590

Claims priority, application Switzerland, Dec. 9, 1974, 016313/74

Int. Cl.² B22C *15/30, 15/14*

U.S. Cl. 164—194 **11 Claims**



1. Apparatus for the production of foundry molds adapted to simultaneously effect both free-fall jolting and squeezing of said molds during the production thereof comprising:

a mold forming assembly at least including a pattern device and a molding box capable of having material for forming said mold contained therein;

jolter-squeezing means including a press, a jolter table and at least a pair of columns, said press and said columns being structured to form a gantry, said columns rigidly interconnecting said jolter table and said press and extending continuously therebetween;

conveyer means located in operative proximity relative to said jolter-squeezing means for reversibly moving said mold forming assembly between one position, at which said molding box is placed on the pattern device and molding material is filled thereinto, and another position on said jolter table within said gantry for simultaneous free-fall jolting and squeezing of said filled mold forming assembly;

means extending between said one position and said another position for supporting and guiding said mold forming assembly while said assembly is being conveyed by said conveyor means between said one position and said another position;

means operatively associated with said guiding and supporting means for raising and lowering said guiding and supporting means; and

coupling means operably engageable between said mold forming assembly and said conveyer means for enabling coupling and uncoupling of said mold forming assembly and said conveyer means to effect movement of said mold forming assembly to said one and said another position during production of said foundry mold, with said mold forming assembly being uncoupled from said conveyer means after said mold forming assembly has been placed in said another position.

4,077,462

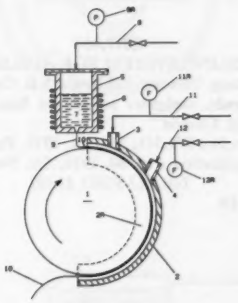
CHILL ROLL CASTING OF CONTINUOUS FILAMENT

John R. Bedell, Sparta; Noel Y. Rothmayer, Madison; Ralph R. Saunders, Lafayette, and Robert W. Smith, Flanders, all of N.J., assignors to Allied Chemical Corporation, Morristown, N.J.

Filed Jun. 30, 1976, Ser. No. 701,338

Int. Cl.² B22D *11/06*

U.S. Cl. 164—429 **5 Claims**



1. In an apparatus for making metal filament including an annular chill roll rotably mounted around its axis and means for depositing molten metal onto the peripheral surface of the chill roll as it is being rotated, the improvement which comprises: a stationary housing surrounding the peripheral surface of the chill roll in an arc beginning at the vicinity of the point of deposition of the molten metal onto the chill roll and terminating at a predetermined point of stripping of the solid filament from the chill roll, and defining a gap between the peripheral surface of the chill roll and the interior of the housing, said housing including means providing a seal along the length of the housing between it and the chill roll to prevent excessive escape of fluid from the gap, and terminating in an outlet at the predetermined point of stripping of the solid filament from the chill roll for cocurrent discharge of the filament and the fluid; and means for introducing a fluid into the gap defined by the housing for passage through the gap in the direction of rotation of the chill roll, including at least one inlet port being angled in the direction of rotation of the chill roll to insure fluid flow in the direction of movement of the chill roll.

4,077,463

CAUSTIC COOLING SYSTEM

Philip Grosso, Lafayette, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif.

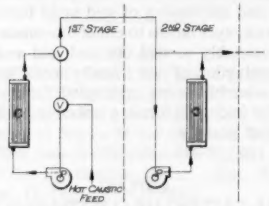
Filed Dec. 16, 1976, Ser. No. 751,303

Int. Cl.² B01D *1/00*

U.S. Cl. 165—1 **3 Claims**

1. In the process of cooling hot, aqueous caustic solutions resulting from the evaporation of dilute, electrolytically produced aqueous caustic solutions, the improvement which com-

prises introducing the hot caustic solution into a cooling system consisting of at least one closed-loop circuit, the circuit consisting of a heat-exchanger device and suitable means to circulate the caustic solution through the heat-exchanger; continuously circulating the caustic solution through the heat-exchanger device under pressure and in the absence of air until



the temperature of the caustic solution is reduced to a desired lower temperature; continuously discharging at least a portion of the cooled caustic solution, while supplying the cooling system with fresh, hot caustic solution in a volume approximately corresponding to the volume of cooled caustic removed from the closed-loop circuit.

4,077,464

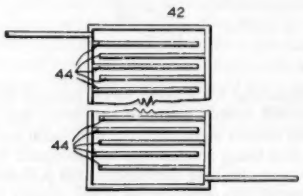
COOLING SYSTEM FOR BUILDINGS

Gerhard W. Moog, Toronto, and Kenneth R. Cooper, Don Mills, both of Canada, assignors to Canada Square Management Ltd., Toronto, Canada

Division of Ser. No. 579,341, May 21, 1975, Pat. No. 4,049,045. This application Aug. 30, 1976, Ser. No. 718,714

Int. Cl.² F24D *11/00*

U.S. Cl. 165—18 **8 Claims**



1. In a system for cooling a building having a cooling load, the system including: a circulation circuit for a cooling fluid; means in said circuit for cooling said fluid; and means for circulating said fluid in said circuit; the building cooling load being connectible in said circuit so that said fluid can pass through the load;

the improvement comprising a heat energy storage reservoir containing a fluid, the reservoir comprising a tank having therein a plurality of upright baffles disposed in spaced, generally parallel positions, each baffle extending from the bottom of the tank to a position above the level of the fluid, and from an upright wall of the tank to a position spaced from an opposite upright wall so that the baffles together define an elongate fluid flow path of serpentine form along which the fluid can flow in the form of a column in a generally horizontal direction, the tank having an inlet connection communicating with one end of said path and an outlet connection communicating with the opposite end of said path, said inlet and outlet connections of the reservoir being coupled to said circulation circuit so that heat energy can be transferred between said fluid in the circulation circuit and the fluid in the reservoir.

4,077,465

BOILERS

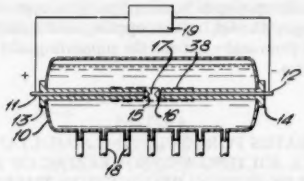
David Preston Simpson, Chester, England, assignor to The Electricity Council, London, England

Filed May 11, 1976, Ser. No. 685,480

Claims priority, application United Kingdom, Aug. 15, 1975, 34021/75

Int. Cl.² F28D *11/06*

U.S. Cl. 165—84 **3 Claims**



1. A method of disrupting vapour films formed in film boiling in boilers having a fire space and a liquid space, the method comprising the step of effecting transient electrical discharges in the boiler liquid at at least one selected location in the boiler such that shock waves produced by the discharges act on surfaces of the boiler liquid space where vapour films are to be disrupted.

2. A boiler having a fire space and a liquid space, and comprising means arranged to effect transient electrical discharges in boiler liquid at at least one selected location in the boiler liquid space such that, in use, shock waves produced by the discharges act on surfaces of the liquid space where vapour films formed in film boiling can be disrupted thereby.

4,077,466

HEATED ROLL; SUCH AS A GODET, IN DRAWING UNITS, FOR EXAMPLE

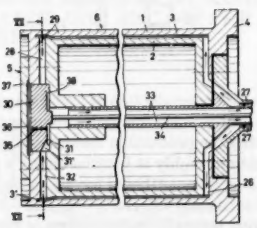
Hans Fleissner, Riehen, Switzerland, assignor to Vepa AG, Switzerland

Filed Oct. 23, 1975, Ser. No. 625,002

Claims priority, application Germany, Oct. 23, 1974, 2450241; Nov. 9, 1974, 2453282

Int. Cl.² F28F *13/06*

U.S. Cl. 165—89 **40 Claims**

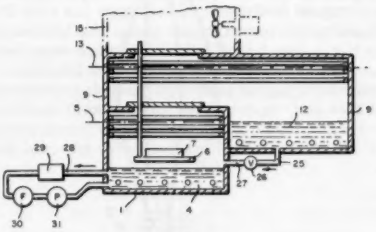


1. A heated roll for the heat treatment of materials during rotation about its axis, which comprises an outer cylindrical shell, an inner cylindrical shell, said inner shell being spaced from the outer shell, wal! means defining an annular space between said shells, partition means in said annular space for forming flow channels for a heating medium passing through said annular space, feed means for introducing the heating medium into said annular space and discharge means for discharging the heating medium from said annular space and from said roll, said discharge means comprising a centrally located backflow conduit means and defining a single stationary discharge opening arranged in said roll below said roll axis for discharging heating medium selectively from a lower portion of said roll to said centrally located backflow conduit means.

4,077,467
METHOD AND APPARATUS FOR SOLDERING, FUSING OR BRAZING

Donald J. Spigarelli, 148 Rutland St., Carlisle, Mass. 01741

Filed Jan. 28, 1976, Ser. No. 652,984
Int. Cl.[2] F28D 15/00
U.S. Cl. 165—105 11 Claims



1. An apparatus for heating an article and material on said article at an elevated temperature to melt said material, said apparatus comprising

a first enclosure having a first reservoir of a first liquid located therein;

means in said first enclosure for heating said first liquid in said reservoir to a first temperature at which said liquid boils, said temperature being equal to said elevated temperature and at least equal to the melting point of said material to form a first body of saturated vapors of said first liquid at said elevated temperature in said first enclosure;

a second enclosure having means for communicating with said first enclosure and having a second reservoir of a second liquid located therein, said second liquid having a boiling point temperature which is lower than that of said first liquid;

means in said second enclosure for heating said second liquid to a second temperature at its said boiling point temperature independently of the heating of said first liquid to form a second body of saturated vapors of said second liquid in said second enclosure;

movable means for inserting said article sequentially into said second body of saturated vapors and said first body of saturated vapors, vapor from said first body of saturated vapors thereby condensing on said article and said material thereon to heat said article and said material to said elevated temperature by transfer of latent heat of vaporization from said condensed vapor to said article and material whereby said material is melted;

said movable means also for removing said article sequentially from said first body of saturated vapors and said second body of saturated vapors;

said second body of saturated vapors in said second enclosure acting as means for condensing vapors from said first body of saturated vapors which are present in said second enclosure when said enclosures are in comminucation, at least a portion of said condensed vapors returning to said first enclosure from said second enclosure.

4,077,468
FLUID HEATER

Marshall L. Owen, Lafayette, and Rudolf F. Nissen, Los Gatos, both of Calif., assignors to Owen Power Industries, Inc., Old Sacramento, Calif.

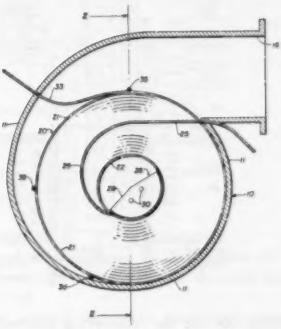
Filed Oct. 12, 1976, Ser. No. 731,226
Int. Cl.[2] F28D 7/10
U.S. Cl. 165—159 6 Claims

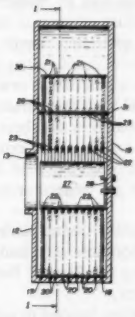
1. A fluid heater comprising

a housing having a curved wall and two flat side walls and having a tangential hot gas inlet in said curved wall and a gas outlet opening from a central portion of a flat side wall,

a plurality of flat helices of tubing within said housing with each helix woulnd with each turn in contact with its adjacent turn,

a first fluid passageway passing from the interior turn of each helix to a position beyond the outer turn with said first passageway offset from the plane of said helix and contacting each turn of said helix at one point, said plurality of helices stacked with said first fluid passageways in corresponding positions and bending toward the inner winding of each helix in the direction of gas flow through





the housing, and said first passageways in contact with the next adjacent helix whereby said helices are spaced from one another a distance equal to the diameter of said first passageway, and whereby said first passageways collectively form a barrier to the flow of hot gas between adjacent helices,

a second fluid passageway passing from the outer turn of each helix, said first passgeways and second passageways passing through said housing,

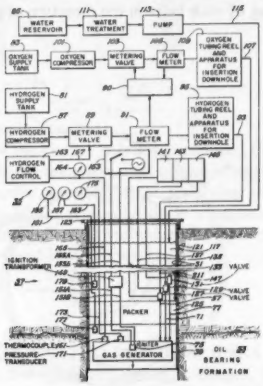
each helix with its first passageway and second passageway forming a continuous fluid flow path, and

means to introduce fluid into one of said first passageway and said second passageway.

4,077,469
DOWNHOLE RECOVERY SYSTEM

Joseph T. Hamrick, Roanoke, and Leslie C. Rose, Rocky Mount, both of Va., assignors to World Energy Systems, Fort Worth, Tex.

Continuation-in-part of Ser. No. 534,778, Dec. 20, 1974, Pat. No. 3,982,591. This application Sep. 27, 1976, Ser. No. 727,039
The portion of the term of this patent subsequent to Sep. 28, 1993, has been disclaimed.
Int. Cl.² E21B *43/24*
U.S. Cl. 166—59 **31 Claims**



1. A system for use for recovering hydrocarbons or other materials from underground formations penetrated by a borehole comprising:

a gas generator locator in the borehole at or near the level of said formations,

said gas generator comprising: a housing forming a chamber defining a combustion zone and having an upper inlet end for receiving fuel and an oxidizing fluid for forming a combustible mixture of gases in said combustion zone for ignition, and a restricted lower outlet for passage for heated gases,

means, including conduit means extending from the surface, for supplying fuel from the surface to said inlet end of said gas generator located in said borehole,

means, including conduit means extending from the surface, for supplying an oxidizing fluid from the surface to said inlet end of said gas generator located in said borehole, and

valve means remotely controllable from the surface and located in said borehole near said gas generator for separately controlling the flow of fuel and oxidizing fluid to said gas generator,

said valve means when located in said borehole near said gas generator being inaccessible without withdrawing said gas generator from said borehole.

4,077,470
WELL CENTRALIZER AND METHOD OF MAKING

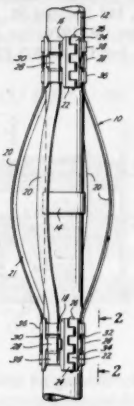
Burlie Newton Dane, Weatherford, Tex., assignor to Weatherford/Lamb, Inc., Houston, Tex.

Filed Jan. 27, 1977, Ser. No. 762,907
Int. Cl.² E21B *17/10*
U.S. Cl. 166—244 R **7 Claims**

1. In a centralizer having axially spaced collars for attachment about a casing and a plurality of outwardly bowed elements connected to each collar, the improvement in connecting means between one of said bowed elements and one of said collars comprising,

a circumferential opening in said collar forming opposing shoulders on opposite sides of the opening,

a generally U-shaped offset in the end portion of said bowed element positioned in said opening, and



a locking tab extending from the collar across the inside of said offset and extending through the opening between the offset and the collar thereby locking the offset in the opening and locking the locking tab in a holding position.

4,077,471
SURFACTANT OIL RECOVERY PROCESS USABLE IN HIGH TEMPERATURE, HIGH SALINITY FORMATIONS

Russell D. Shupe, and Jim Maddox, Jr., both of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 1, 1976, Ser. No. 746,641
Int. Cl.² E21B *43/22, 43/24*
U.S. Cl. 166—275 **19 Claims**

1. A method for recovering petroleum from a subterranean, permeable, petroleum-containing formation penetrated by at least one injection well and by at least one spaced apart production well, both wells being in fluid communication with the formation, the temperature of the formation being from about 70° F to about 300° F., said formation containing water having a salinity from 70,000 to 220,000 parts per million total dissolved solids, comprising:

(1) injecting into the formation via the injection well an aqueous, saline, phase-stable surfactantcontaining fluid comprising:

(a) a water soluble alkylpolyalkoxyalkyl sulfonate or alkylarylpolyalkoxyalkyl sulfonate having from 8 to 24 carbon atoms in the alkyl chain and from 1 to 20 alkoxy groups;

(b) a water insoluble nonionic surfactant comprising an ethoxylated alkyaryl or an ethoxylated aliphatic compound having from 8 to 24 carbon atoms in the alkyl or aliphatic chain and containing from 1 to 20 ethoxy groups;

(c) said surfactant fluid having a salinity from about 70,000 to about 220,000 parts per million total dissolved solids, said surfactant fluid displacing oil toward the production well; and

(2) recovering petroleum displaced by the surfactant fluid from the formation via the production well.

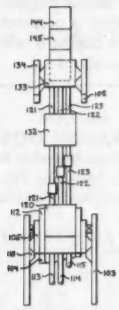
4,077,472
WELL FLOW CONTROL SYSTEM AND METHOD

John C. Gano, Carrollton, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Jul. 26, 1976, Ser. No. 708,843
Int. Cl.² E21B *17/02, 23/02, 43/01*
U.S. Cl. 166—315 **31 Claims**

1. A well completion system comprising: a tubing hanger for

supporting lower tubing string means in a well for producing well fluids from a producing formation communicating with said well below said tubing hanger; an upper casing string around said tubing hanger; a casing hanger secured with an intermediate lower portion of said upper casing string and supporting said tubing hanger; a lower casing string supported from said casing hanger; seal means between said casing hanger and said upper casing string; lower tubing string means connected with and supported by said tubing hanger; a pack-off means around said tubing hanger in said casing hanger for sealing the upper end of an annulus in said well at said tubing hanger around said lower tubing string means; a valve package lock releasably coupled into said tubing hanger to provide fluid communication through said tubing hanger into said lower tubing string means; upper tubing string means connected at a lower end into said valve package lock; valve means in said



upper tubing string means for controlling fluid flow through said upper tubing string means; and a tubing head connected with the upper end of said upper tubing string means.

26. An offshore well completion system comprising: a string of intermediate casing having a landing nipple along a lower end portion thereof; a casing hanger supported in said landing nipple; a string of inner casing secured with and suspended from said casing hanger; a seal between said casing hanger and said intermediate casing; a tubing hanger supported in said casing hanger; a seal between said tubing hanger and said casing hanger; lower tubing means secured with and suspended from said tubing hanger and sealed therewith; and said landing nipple, said casing hanger, said tubing hanger, and said seals defining a pressure barrier located below the ocean floor below probable surface damage to aid in containing said well below said barrier.

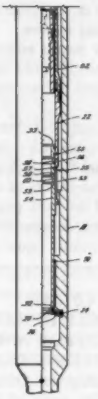
4,077,473
WELL SAFETY VALVE

Fred E. Watkins, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.

Filed Apr. 18, 1977, Ser. No. 788,190
Int. Cl.² E21B *43/12*
U.S. Cl. 166—323 **2 Claims**

1. In a well safety valve for controlling the fluid flow through a well tubing, said valve having a body adapted to be positioned in the well tubing and having a valve closure member in said body moving between open and closed positions, a longitudinally movable tubular member in said body for controlling the movement of the valve closure member, first means for moving the tubular member in a first direction, second means for moving the tubular member in a second direction, said tubular member including a first upper and a second lower telescoping section, releasable locking means normally securing the telescoping sections together, said releasable means constructed to release upon the application of a predetermined force less than a force sufficient to cause damage to the valve, said releasable locking means normally securing the telescoping sections in an extended position whereby upon the application of said predetermined force, said sections will telescope towards each other preventing damage to said valve, the improvement comprising,

a first shoulder connected to the inside of the body adjacent the second lower telescoping section and directed downwardly,



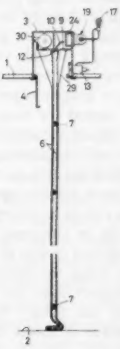
a second shoulder connected to the outside of the lower telescoping section below said first shoulder and directed upwardly, and

said first and second shoulders positioned whereby they engage when the tubular member moves upwardly whereby the first upper and second lower telescoping sections are automatically extended.

4,077,474
FLAME AND SMOKE SHUTOFF SYSTEM

Tadashi Hattori, No. 15-20, 1-chome, Kamori, Kishiwada, Osaka, Japan

Filed Feb. 9, 1976, Ser. No. 656,693
Claims priority, application Japan, Feb. 14, 1975, 50-19158; May 6, 1975, 50-55702
Int. Cl.² E06B *5/16*
U.S. Cl. 169—48 **6 Claims**



1. A flame and smoke shutoff device for an enclosed area comprising:

a container having a pivotally mounted cover on the underside thereof;

nonflammable curtain means mounted within said container for falling downward from said container when said cover is open and for confining fire and smoke, said curtain means being of sufficient length to hang from said con-

tainer to a surface below said container, and said curtain means being comprised of:

a double layer of non-flammable curtain material, and

spacers horizontally positioned between said double layers for separating said layers;

detecting means for detecting heat and smoke;

cover opening means operatively connected to said cover for opening said cover in response to detecting of heat and smoke by said detecting means;

gas shutoff liquid supply means adjacent said curtain means for supplying a gas shutoff liquid inside said curtain means when said curtain means is hanging downward from said container;

bubbling means between said gas shutoff liquid supply means and said curtain means and directed between said double layer of curtain material for foaming said gas shutoff liquid supplied inbetween said layers of curtain material; and

valve means connected to said gas shutoff liquid supply means and said detecting means for controlling the flow of liquid from said gas shutoff liquid supply means.

4,077,475

TRACTOR TYPE VEHICLE INCLUDING ENGINE AND LOAD CONTROL THEREFOR AND PROVIDED WITH ROTARY WORKING IMPLEMENT

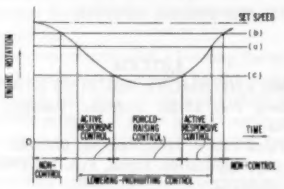
Masamichi Hino, Suita; Shigeaki Okuyama, Kawachinagano; Katsumi Ito; Yoshimi Ota, both of Sakai, and Mikio Kinoshita, Izumisano, all of Japan, assignors to Kubota Tekko Kabushiki Kaisha, Osaka, Japan

Filed Apr. 26, 1976, Ser. No. 680,479

Claims priority, application Japan, Apr. 25, 1975, 50-51092

Int. Cl.[2] A01B *63/112*

U.S. Cl. 172—3 **6 Claims**



1. A tractor type vehicle including an engine and a load control therefor, said vehicle being provided with a rotary working implement pivotally attached to a body of the vehicle, said engine including a speed setter for giving an output signal (A) corresponding to setting a suitable value of rotation of the engine, an engine speed sensor for sensing actual rotation of the engine and for giving an output signal (E) corresponding thereto, first operational means for comparing the actual engine speed signal output (E) of the speed sensor with the said set value signal output (A) of the speed setter and for giving an output signal (A−E) indicating which of these two values is larger and by what difference, control means for automatically raising and lowering the rotary working implement with respect to the vehicle body in response to the output signal (A−E) of said first operational means so that the rotary working implement is lowered when the actual engine speed sensed by the speed sensor is higher than the said set value of the engine rotation and that the rotary working implement is raised when the actual speed is lower than the set value, the improvement comprising:

a working depth setter for giving an output signal (H) corresponding to setting any desired working depth of said rotary working implement,

a depth sensor for sensing actual working depth and for giving an output signal (L) corresponding thereto,

second operational means provided in between the said first operational means and the said control means, for receiving the output signals (A−E, H, L) of the first operational means, of the working depth setter and the depth sensor, and for performing operation of these input signals and giving an output signal (A−E+H−L) to be furnished as an input signal for the said control means, in such manner that the actual working depth sensed by the depth sensor as deeper than the said desired working depth will contribute to raising the rotary working implement and that the actual depth sensed as shallower than the desired depth will contribute to lowering the rotary working implement,

further means for prohibiting lowering the said rotary working implement, to be actuated only when the sensed speed signal output (E) of the speed sensor falls beneath a value set in a predetermined interlocking relation with the set engine speed, and

forced raising means for raising said rotary working implement, said forced raising means receiving information (A−E) from the first operational means and being actuated only when the actual engine speed sensed by the speed sensor falls below a predetermined value, namely when the speed of the engine is below the predetermined forced-raising-rotation-speed (c).

4,077,476

SOIL CULTIVATING IMPLEMENTS

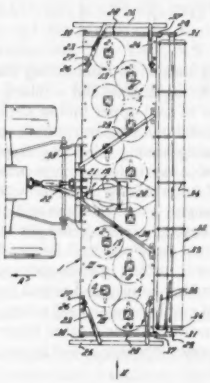
Cornelis van der Lely, 7 Bruschenrain, Zug, Switzerland

Filed Mar. 3, 1976, Ser. No. 663,440

Claims priority, application Netherlands, Mar. 6, 1975, 7502633

Int. Cl.[2] A01B *33/06, 33/12*

U.S. Cl. 172—49 **12 Claims**



1. A rotary harrow comprising a frame and a plurality of soil-working members being supported on a portion of said frame, said members being rotatable about substantially vertical axes of rotation defined by respective shafts journalled in said portion, said members being positioned to work overlapping strips of soil during operation, each of said members comprising a single downwardly extending tine that has a lower active portion spaced from its corresponding axis of rotation, driving means engaging and rotating said soil-working members about their axes and said shafts being arranged at the corners of a figurative zig-zag line that extends transverse to the normal direction of harrow travel when the harrow is viewed in plan, said shafts being positioned in two substantially straight rows, including a leading row and a rear row, the axes of rotation of the members in each row being spaced apart by substantially regular distances and said rows extending transverse to the direction of travel, an imaginary straight line interconnecting the axes of rotation of those members of the leading row being substantially parallel to a second straight line interconnecting the axes of rotation of those members of the rear row, and the distance between the two imaginary lines being substantially the same as the distance between the axes of

rotation of immediately neighboring members in either of said two rows, the tines of the members of the leading row being orientated in one direction and along said imaginary straight line that interconnects the axes of rotation of those members when the tines of the rear row are orientated in an opposite direction and along said second imaginary straight line that interconnects the axes of rotation of the members of said rear row.

4,077,477

SOIL CULTIVATING IMPLEMENTS

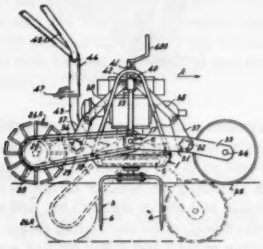
Cornelis van der Lely, Zug, Switzerland, and Ary van der Lely, Maasland, Netherlands, assignors to C. van der Lely N.V., Maasland, Netherlands

Division of Ser. No. 371,476 Jun. 19, 1973, Pat. No. 3,945,441. This application Dec. 15, 1975, Ser. No. 640,783

Claims priority, application Netherlands, Jun. 23, 1972, 7208616

Int. Cl.² A01B *33/00*

U.S. Cl. 172—114 **9 Claims**



1. A soil cultivating machine comprising a frame and a plurality of soil working members supported on a portion of said frame, said members being arranged in a row that extends transverse of the normal direction of operative travel of the machine, rotatable supporting members being located in front of and behind said row of soil working members with respect to the direction of travel and arms linking the supporting members to one another at a common connection to the frame portion, said connection being located above the soil working members and said arms extending downwardly from said connection, away from each other, said arms being settable to connect the rotatable supporting members in position relative to said frame portion and sustain the soil working members from the ground surface, the rear one of said supporting members being a roller and driving means connected to rotate said roller, the periphery of said roller including a number of elongated soil contacting elements which extend in the same general direction of the axis of rotation of the roller.

4,077,478

DOWN PRESSURE CONTROL MECHANISM FOR GRAIN DRILLS

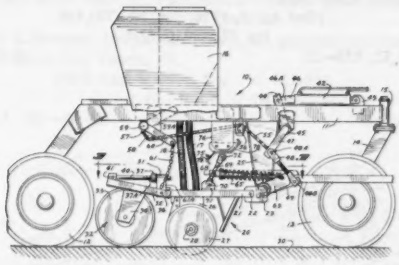
Chester G. Neukom, Jamestown, N. Dak., assignor to Haybuster Manufacturing, Inc., Jamestown, N. Dak.

Filed Feb. 22, 1977, Ser. No. 770,459

Int. Cl.² A01B *61/00*; A01C *5/00*

U.S. Cl. 172—267 **15 Claims**

1. A furrow opener assembly for a grain drill or the like having a main frame, a subframe movably mounted to said main frame and including a furrow opener member, said mounting of said subframe permitting movement of said furrow opener to a working position with the furrow opener member in the ground and upwardly therefrom, and means to resiliently resist upward movement of said furrow opener member and said subframe comprising a linkage means operably connected between said main frame and said subframe, spring means connected to said linkage means, means guiding said linkage means in a desired path of movement as said subframe moves upwardly, said means guiding include a first working position guide section and a second guide section, said spring means resisting upward movement of the subframe through said linkage means at a first rate when the linkage



means is guided in the working position guide section, and at a second substantially lower rate for each increment of upward movement of the subframe when the linkage means is guided in the second guide section after upward movement of said subframe from its working position.

4,077,479

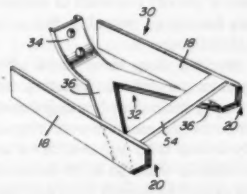
CULTIVATOR PLOW SWEEPS WITH EXTENDED VERTICAL VANES CONNECTED BY BRACE

Robert C. Tibbs, Hospital Dr., Cleveland, Miss. 38732

Filed Jun. 21, 1976, Ser. No. 698,199

Int. Cl.² A01B *39/26*

U.S. Cl. 172—730 **2 Claims**



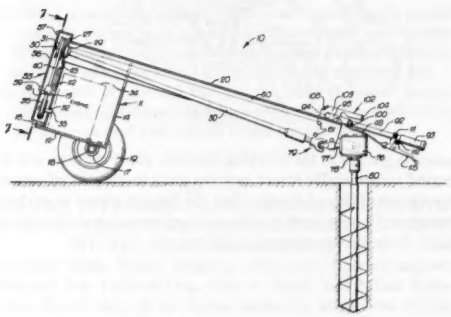
1. In a cultivator including a plow comprising a pair of sweeps arranged joined at a center of the plow and disposed extending outwardly and downwardly from one another, each toward an outer end, and forming means for pushing soil outward from the center of the plow, the improvement comprising vane means disposed on the outer end of one of the sweeps for preventing weed seeded soil from being placed on a herbicide banded area adjacent a path of movement of the cultivator, the vane means including a planar element disposed substantially perpendicularly to the extent of the associated sweep and provided with a pointed end extending in a direction parallel to the normal direction of movement of the plow along the path of movement of the cultivator, each of the sweeps being provided with vane means, with each of the vane means being like the other, a brace being connected between the pair of vane means for rigidifying the vane means, the vane means being mounted on a plow including an upturned shank and a pair of sweeps disposed extending away from the shank and at an acute angle with respect to one another for forming a Y in cooperation with the shank.

4,077,480

ONE MAN OPERATED, TWIN WHEEL MOUNTED POWERED EARTH DRILL

Paul R. Carlson, San Bernardino, and Richard L. Carlson, Yucaipa, both of Calif., assignors to Ground Hog, Inc., San Bernardino, Calif.

Filed Jul. 8, 1976, Ser. No. 703,459
Int. Cl.[2] E21C *11/02*
U.S. Cl. 173—22 10 Claims



1. In a one man operated twin wheel mounted powered earth drilling tool, the combination of:

axle means mounting a pair of small air tired wheels on its opposite ends;

a U-shaped engine saddle including an engine supporting platform fixed on said axle means and two parallel transverse walls rigidly fixed respectively to front and rear edges of said platform at right angles therewith and extending equal distances upwardly therefrom;

engine means seated on and rigidly secured to said saddle with its center of gravity rearward of said axle means, said engine means having an output pulley means extending rearwardly therefrom;

an elongated inverted deep sheet metal channel member constituting a tongue for manipulating said tool and a downwardly open main shaft housing therefor, a rear end integral portion of said member overlying said saddle and being rigidly united with upper ends of said two transverse engine saddle walls so as to be parallel with said platform and extend forwardly from said saddle a substantial distance;

a self-aligning bearing mounted on said rear transverse engine saddle wall in general alignment with said shaft housing member;

a main shaft covered by and co-extensive with said shaft housing and having its rear end supported by and journalling in said self-aligning bearing;

power transmission means connecting said engine output pulley means to a rearward portion of said main shaft to drive the latter;

a gear box having a horizontal high speed input shaft and a vertical downward low speed output shaft;

means mounted on the forward end of said main shaft housing inverted channel member for pivotally supporting said gear box on a transverse axis;

a splined universal joint unit embodied in the forward end of said main shaft and connected to the input shaft of said gear box, said output shaft having means for readily connecting an earth drill thereto; and

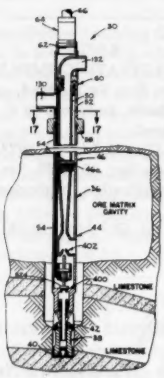
handle bar means provided on said main shaft housing for manually guiding said tool while earth drilling.

4,077,481

SUBTERRANEAN MINING APPARATUS

Philip R. Bunnelle, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Filed Jul. 12, 1976, Ser. No. 704,277
Int. Cl.[2] E21C *45/00*
U.S. Cl. 175—232 45 Claims



1. A subterranean mining apparatus comprising a multi-section tool string including; inner and outer conduits sealed from each other; a drill bit at the lower end of the string; an eductor pump section including an eductor nozzle with a foot valve below said nozzle and above the drill bit; and a mining nozzle extending transversely of the tool string; means for rotating the tool string during mining and while drilling a well cavity into subterranean deposits of granular ore for defining a cavity that loosely receives said tool string; means for directing liquid at system pressure into the tool string through said outer conduit into contact with and in directions tending to close said eductor and mining nozzles and open said foot valve; means for supplying and controlling the pressure of a control fluid; and control means responsive to control fluid pressures that act in opposition to said liquid at system pressure and that are equal to or below the system pressure for selectively opening and closing said mining nozzle, said eductor nozzle, and said foot valve for allowing the tool string to be changed between its drilling mode and mining mode while in the well cavity.

4,077,482

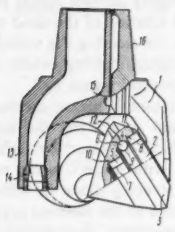
THREE CONE ROCK BIT

Rolen Arsenievich Ioannesian, naberezhnaya Tarasa Shevchenko, 1/2, kv. 49; Jury Rolenovich Ioanesian, Matveevskaya ulitsa, 18, korpus 2, kv. 63; Polikarp Avtonomovich Paly, ulitsa Zoi i Alexandra Kosmodemyanskikh, 4, korpus V, kv. 316; Leonid Pavlovich Konstantinov, Lomonosovsky prospekt, 23, kv. 495, and Jury Evgenievich Vladislavlev, Smolensky bulvar, 6-8, kv. 114, all of Moscow, U.S.S.R.

Filed Sep. 27, 1976, Ser. No. 726,810
Int. Cl.[2] E21B *9/08*
U.S. Cl. 175—340 3 Claims

1. An asymmetric three cone rock bit for drilling holes comprising: a bit head or body having an upwardly extending shank formed about a vertical axis or central axis of the bit body, and three horizontally spaced, downwardly projecting legs extending from said bit body; and generally conically shaped cutters of the same diametric size being journalled on each of said legs and extending downwardly and inwardly therefrom at the same cutter angle, each of said cutters being mounted on a leg for rotation about an axis projecting at an acute angle with respect to said vertical or central axis; said cutters and legs being asymmetrically positioned relative to each other wherein two of said cutters have rotational axes intersecting a plane extending normal to said vertical or central

axis at two points spaced from each other by a greater distance than said points are each spaced from a third point of intersection with said plane of the rotational axis of the third cutter, and wherein said three points of intersection are used to define a circle in said plane; said two points of intersection are angularly spaced circumferentially from each other at an angle



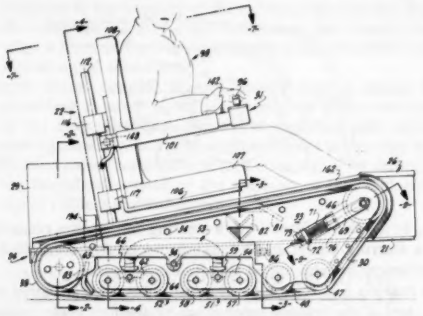
greater than 120° but less than 170°; and a single flow nipple or nozzle means for supplying of a flushing fluid extending downwardly between said two cutters to a position spaced close to the bottom of the drill hole, whereby the flushing action of fluid flow on the hole bottom is intensified and drilling performance is improved.

4,077,483

INVALID VEHICLE

Arthur J. Randolph, 4711 Sonoma Hwy., Santa Rosa, Calif. 94505

Filed Sep. 19, 1975, Ser. No. 614,750
Int. Cl.² B62D *11/02, 23/00*
U.S. Cl. 180—6.5 **2 Claims**



1. An invalid vehicle comprising:

a floor carried between two track mechanisms with each having an endless belt about same and pivotally mounted idler wheels and a rear drive wheel along the bottom engaging the belt,

two electric motors mounted on said floor with a separate one connected to drive each track mechanism through a drive wheel,

said floor being mounted below the top of said drive wheels between said wheels by means mounting said floor in limited pivotal relation to said two track mechanisms, said means comprising fixed rear floor mounts secured to drive wheel shafts and a cross shaft extending laterally between said track mechaisms and pivotally connected to said floor forward of said rear mounts,

battery means carried by said floor,

a seat adjustably mounted on said floor between said track mechanisms for controlled positioning against said floor to provide an occupant with the capability of reaching a surface upon which the vehicle rests, and

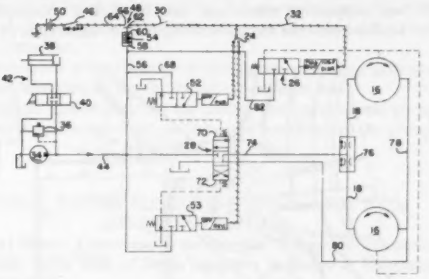
control means adjacent said seat for connecting and disconnecting said battery means to separate electric motors to propel and maneuver said vehicle.

4,077,484

HYDRO-ELECTRICAL PRIORITY VALVE AND SPEED CONTROL CIRCUIT

Joseph E. Dezelan, Indian Head Park, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Aug. 9, 1976, Ser. No. 712,624
Int. Cl.² B60K *25/04*
U.S. Cl. 180—44 M **5 Claims**



1. In a hydrostatic auxiliary front wheel drive system for a vehicle which comprises a hydraulic implement pump, a hydraulic implement powered by said pump and motor means drivingly connected to front wheel rotating shaft means rotatable in a forward or a reverse direction, said motor means being powered via motor conduit means by said pump, an improvement comprising:

electrical switch means operating responsive to hydraulic pressure developed by said pump, said electrical switch means including biasing means preventing switching thereof into a closed circuit position until said hydraulic pressure reaches a predetermined value and forcing said switch means into an unswitched open circuit position when said hydraulic pressure drops below said predetermined value;

valve means in said motor conduit means providing a pump hydraulic pressure shut-off mode, a forward-direction mode leading to forward motion of said vehicle, and a reverse-direction mode leading to reverse motion of said vehicle, said valve means including means constraining said valve means in said shut-off mode until said electrical switch means switches to said closed circuit position; and

said constraining means including directional selection means, in series circuit with said switch means, for selecting a respective one of said forward-direction mode and said reverse-direction mode when said switch means is switched into said closed circuit position.

4,077,485

VEHICLE BATTERY MOUNTING APPARATUS

Anthony C. Bonora, and Thomas D. Holt, both of Palo Alto, Calif., assignors to Bolt Vehicles, Incorporated, Sunnyvale, Calif.

Filed Dec. 31, 1975, Ser. No. 645,834
Int. Cl.² B62D *25/00*
U.S. Cl. 180—68.5 **6 Claims**

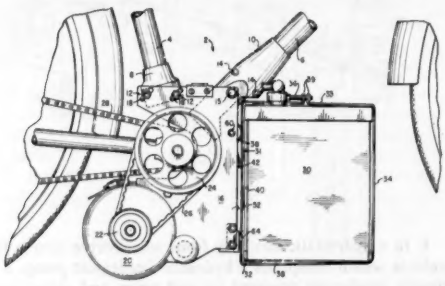
1. In an electrically powered vehicle having a vehicle frame with a first generally vertical component, a battery, a motor powered by said battery, at least one powered wheel connected to said frame, a first sprocket operatively connected to said motor, a second sprocket operatively connected to said wheel, and means drivingly connecting said first sprocket to said second sprocket, the improvement comprising:

a bracket being slidably mounted relative to said first generally vertical component for translation therealong,

releasable fastener means for selectively permitting when released and preventing when engaged translation of said

bracket along said first component means for mounting one of said first and second sprockets to said bracket for movement therewith relative to said frame, means for mounting the other of said first and second sprockets to said frame, and,

means for mounting said battery to said bracket for movement therewith relative to said frame, said battery mounting means including means for supporting said battery, and pivot means connecting said supporting means to said bracket, said pivot means including isolation means for preventing movement of said battery from causing movement of said one sprocket, said pivot means comprising an inner cylindrical member connected at its ends to one of said supporting means and said bracket, a compressible resilient material circumscribing the circumference of said



inner cylindrical member, and a sleeve snugly circumscribing said compressible resilient material and connected to the other of said supporting means and said bracket, said pivot means permitting rotation of said battery about the axis of said inner cylindrical member, said compressible resilient material damping and limiting movement of said battery and absorbing the force of said battery due to said movement so that the battery force does not cause substantial movement of said one sprocket,

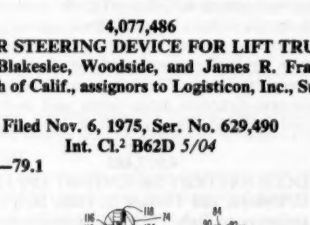
said battery exerting a gravitational force on said bracket tending to urge said bracket-mounted sprocket away from said frame-mounted sprocket thereby tensioning said connecting means when translation of said slidably mounted bracket is permitted by said fastener means and thereafter preventing a decrease in the tension of said connecting means.

4,077,486

POWER STEERING DEVICE FOR LIFT TRUCK

Thomas R. Blakeslee, Woodside, and James R. Francy, Los Gatos, both of Calif., assignors to Logisticon, Inc., Sunnyvale, Calif.

Filed Nov. 6, 1975, Ser. No. 629,490
Int. Cl.² B62D 5/04
U.S. Cl. 180—79.1 **2 Claims**



1. In combination with a self-powered vehicle of the type which has at least one ground engaging steering wheel which is manipulatable by an operator using a rotatable hand wheel engaged with one end of a steering column, an attachment for converting the vehicle into a manually operable vehicle which can also be selectively power steered to follow an external path, the attachment comprising

tachometer means connected to the hand wheel for generating a power steering control signal proportional to the speed of manual rotation of the hand wheel,

a steering acutator for steering the vehicle by manipulating the ground engaging steering wheel in response to the power steering control signal, and

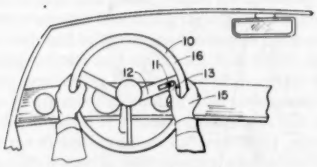
manually operable clutch means mechanically connected between the hand wheel and the steering column for enabling the vehicle operator, by shifting the position of the hand wheel with respect to the steering column, to select a power steering mode in which the tachometer means is connected to the steering actuator and the hand wheel is simultaneously disengaged from the steering column and a manual mode in which the power steering actuator is deactivated and the hand wheel is engaged with the steering column.

4,077,487

VEHICLE AUXILIARY BRAKING SYSTEM

Peter D. Misinchuk, Toronto, Canada, assignor to The Raymond Lee Organization, Inc., New York, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,116
Int. Cl.² B60T 7/02
U.S. Cl. 180—82 R **1 Claim**



1. In a vehicle fitted with a steering mechanism controlled by a steering wheel and a braking mechanism controlled by mechanical linkage joined to a foot brake pedal,

a braking control system that provides for alternative control of the braking mechanism by the foot brake pedal or by electrical switching means mounted on the steering wheel of the vehicle, in which

said braking control system incorporates a linear motor electrically connected to said electrical switching means and mechanically linked to the mechanical linkage joining the braking mechanism to the foot brake pedal, with said electrical switching means including a movable actuator,

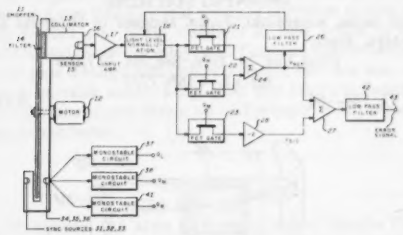
said linear motor incorporating an actuator, the direction of movement and proportionate amount of travel of which is responsive to the direction of travel and proportionate amount of travel of the actuator of the said electrical switching means to which the linear motor is electrically connected, in which

the actuator of the linear motor is linked to the mechanical linkage of the braking system in only one direction of travel so that the foot pedal of the braking system may apply braking force to the braking mechanism of greater magnitude than that determined by the position of the actuator of the linear motor, and in which the actuator of the electrical switching means is mounted on the steering wheel.

4,077,488
GUIDANCE ASSIST SYSTEM FOR AGRICULTURAL MACHINES

Clarence L. Bennett, Jr., Groton; Carl E. Bohman, Sudbury, both of Mass.; Joseph D. DeLorenzo, Webster, N.Y., and Harald Wilhelmsen, Carlisle, Mass., assignors to Sperry Rand Corporation, New York, N.Y.

Filed Jun. 15, 1976, Ser. No. 696,444
Int. Cl.[2] B62D 1/28
U.S. Cl. 180—98 11 Claims



1. Guidance assist apparatus for directing the lateral movement of an agricultural machine relative to the edge of a severed crop comprising:

optical sensing means for producing a signal in response to the intensity of the reflected illumination from the crop material in view thereof,

scanning means disposed relative to said optical sensing means for providing thereto periodic scans of the crop material preceding the machine wherein said periodic scans include the severed crop edge and wherein the signal from said optical sensing means will change in response to the intensity of the reflected illumination from the crop and severed crop material as the severed crop edge is scanned thereby resulting in a discontinuity in the output signal therefrom,

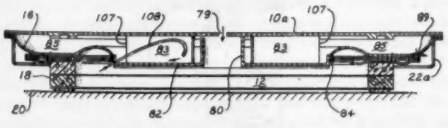
circuit means coupled to said optical sensing means for providing an error signal representative of the deviation of the discontinuity in the output signal of said optical sensing means from a predetermined point in the scan, and

utilization means responsive to said error signal for directing the lateral movement of the machine so that said error signal reduces toward zero.

4,077,489
DYNAMIC FLUID SYSTEM FOR IMPROVING STABILITY OF A FLUID CUSHION VEHICLE

Jack F. Vaughen, 26807 Spring Creek Rd., Rancho Palos Verdes, Calif. 90274

Filed Jan. 26, 1976, Ser. No. 652,374
Int. Cl.[2] B60V 1/00
U.S. Cl. 180—124 1 Claim



1. A dynamic fluid system for promoting stability in a fluid-cushion vehicle that has a plurality of fluid cushion cavities defined at least in part by surrounding, substantially circular, inflatable seal hanger envelopes, said system including:

means of supplying high pressure fluid to each of the cavities with a portion of the supplied fluid escaping to the atmosphere under the rim of the cavity;

passage means from each cavity to the corresponding hanger envelope to supply fluid to the envelope, the passage means being substantially longer than its bore diameter and restricting the flow to the envelope to cause a substantial pressure drop along the length of the passage means;

an outlet from each hanger envelope to the atmosphere, said outlet being restricted to maintain a pressure in the envelope that is substantially lower than the pressure in the corresponding fluid cushion cavity,

said fluid cushion cavities being arranged into three groups to provide three different independent areas of support for the vehicle to support the vehicle in a statically determinant manner in which one area of support straddles a centerline of the vehicle, one of the two other areas of support being on one side of this centerline and the other of the two areas of support being on the other side of this centerline,

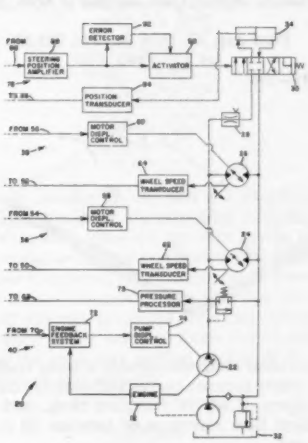
at least one of the three areas of support including a group of at least two of the fluid cushion cavities, and

passages interconnecting the hanger envelopes of said group to equalize pressures in the hanger envelopes of the group.

4,077,490
TOTAL POWER FLUID SYSTEM VEHICLE WITH STEERING CONTROL

Robert Henry Casterton, Waterloo, and Gordon K. Wiegardt, Cedar Falls, both of Iowa, assignors to Deere & Company, Moline, Ill.

Filed Apr. 15, 1977, Ser. No. 787,790
Int. Cl.[2] B62D 11/04
U.S. Cl. 180—143 8 Claims



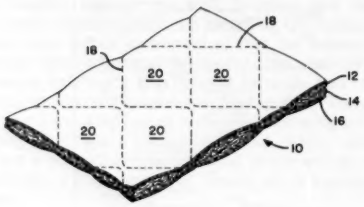
1. In a vehicle with a total power fluid system having first and second drive wheels respectively driven by first and second variable displacement fluid motors fluidly connected to an engine driven variable displacement fluid pump, a fluid reservoir, pump control means operatively connected to the pump and responsive to the pump outlet pressure to change the displacement of the pump to maintain a predetermined pump outlet pressure at variable output fluid flows, operator speed input means providing a speed input signal, first motor displacement means operatively associated with the first motor responsive to the speed input signal and the speed of the first motor to change the displacement thereof proportional to the difference therebetween, second motor displacement means operatively associated with the second motor responsive to the speed input signal and the speed of the second motor to change the displacement thereof proportional to the difference therebetween, a steering control comprising: fluidly steerable wheel means turnable to control the direction of turn of the vehicle, valving means actuable to selectively interconnect the steerable wheel means to the pump and the reservoir to respectively

turn and free caster the steerable wheel means and to selectively block the steerable wheel means from the pump and the reservoir to prevent turning of the steerable wheel means; operator steering input means providing turn signals proportional to the desirable degree of wheel means turn; steerable wheel control means operatively associated with the valving means and the operator steering input means responsive to the turn signals to actuate the valve means to turn the steerable wheel means in proportion to the turn signal, to a predetermined value of the turn signal to cause the valving means to block the steerable wheel means from the pump and the reservoir, and to the lack of a turn signal to caster the steerable wheel means by connecting the steerable wheel means to the fluid reservoir; first means interposed in the connection between the operator speed input means and the first motor displacement means responsive to turn signals within a first predetermined range to alter the speed input signal to the first motor displacement means; and second means interposed in the connection between the operator speed input means and the second motor displacement means responsive to turn signals within a second predetermined range to alter the speed input signal to the second motor displacement means whereby a speed differential will be introduced between the first and the second drive wheels to augment the turning of the vehicle by the steerable wheels or will turn the vehicle when the turn signal is lacking indicating a failure in the steerable wheel control means.

4,077,491
ACOUSTICAL COMPOSITE

Keith M. Hankel, Dayton, Ohio, assignor to Acon, Inc., Dayton, Ohio

Filed Aug. 27, 1976, Ser. No. 718,220
Int. Cl.² E04B *1/99*
U.S. Cl. 181—290 **5 Claims**



1. An acoustical composite capable of being readily bent and shaped to follow intricate curves and contours consisting of:

a. two layers of woven fiberglass cloth, each haivng an acoustical flow resistance of between 10 rayls and 20 rayls, and

b. a flexible, porous, non-woven, fibrous material sandwiched between said woven fiberglass cloth layers and bonded thereto,

said composite having a total thickness of between about ¼ and ¾ inch and a total weight of between about 1 ounce per square foot and 4 ounces per square foot and a total acoustical flow resistance of between 20 rayls and 80 rayls and being resistant to fire, deterioration, swelling, and liquid retention.

4. An acoustical assembly for use as a lining material in association with noise generating machinery consisting of:

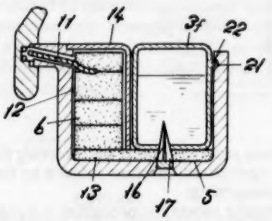
a. a composite capable of being readily bent and shaped to follow intricate curves and contours consisting of two layers of woven fiberglass cloth, each having an acoustical flow resistance of between 10 rayls and 20 rayls and a flexible, porous, non-woven, fibrous material sandwiched between said woven fiberglass cloth layers and bonded thereto, said composite having a total thickness of between about ¼ and ¾ inch and a total weight of between about one ounce per square foot and four ounces per square foot and a total acoustical flow resistance of between 20 rayls and 80 rayls and being resistant to fire, deterioration, swelling, liquid retention and other adverse conditions as may be found in said noise generating machinery, and

b. a highly porous non-woven fibrous mat having a binder therein joined to said composite and serving as a dead air space relative thereto.

4,077,492
AUTOMATIC LUBRICATORS FOR RINGS OF A SPINNING MACHINE

Yasuo Inoue, Amagasaki, Japan, assignor to Hiroyuki Kanai, Ashiya, Japan

Filed Aug. 24, 1976, Ser. No. 717,185
Int. Cl.² F16N *7/12*
U.S. Cl. 184—64 **9 Claims**

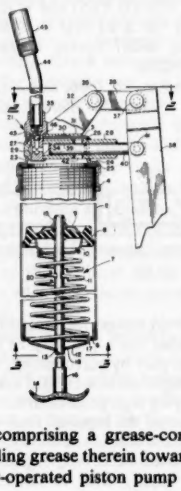


1. The combination of a holder for the ring of ring spinning machine or a twisting machine, said holder having at least one upwardly open, closed bottom recess therein, an oil supply tank removably mounted in said recess said oil supply tank having in its bottom an oil opening, and an oil-retaining substance in the closed bottom of said recess and having a wick extending therefrom to the point of said holder where said ring is held for automatic lubrication of the ring.

4,077,493
GREASE GUN

Robin W. Spaude, and Alvin L. Bowers, both of Granite Falls, Minn., assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Dec. 15, 1976, Ser. No. 750,961
Int. Cl.² F16N *3/12*
U.S. Cl. 184—105 A **5 Claims**



1. A grease gun comprising a grease-containing cylinder having means for feeding grease therein toward one end of said cylinder; and a lever-operated piston pump assembly at said

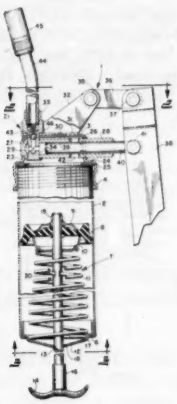
one end operative to pump grease fed thereto through a pump outlet passage; said assembly comprising a head cap screwed onto said one end of said grease-containing cylinder; said means for feeding grease comprising a unitary assembly inserted into said cylinder from said one end thereof and including a plunger in sliding sealed engagement within said cylinder; a rear end cap, a spring compressed between said plunger and said end cap, and a plunger operating rod having a head on its axial inner end operative to retract said plunger toward said rear end cap by axial pull on a T-shaped handle at the axially outer end of said rod; said cylinder at said other end having an inturned flange which is engaged by the peripheral portion of said rear end cap whereby said spring is operative to bias said plunger toward said pump assembly to feed grease in said cylinder to said pump assembly; said T-shaped handle being of length to pass through said inturned flange; and said rear end cap being movable axially away from said inturned flange to increase the bias of said spring on said plunger in the event of sticking of the latter.

4,077,494

GREASE GUN

Robin W. Spaude, and Alvin L. Bowers, both of Granite Falls, Minn., assignors to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Dec. 15, 1976, Ser. No. 750,962
Int. Cl.² F16N *3/12*
U.S. Cl. 184—105 A **4 Claims**



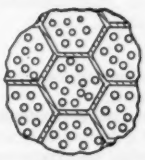
1. A grease gun comprising a grease-containing cylinder having means for feeding grease therein toward one end of said cylinder; and a lever-operated piston pump assembly at said one end operative to pump grease fed thereto through a pump outlet passage; said assembly comprising a sheet metal head cap screwed onto said one end of said grease-containing cylinder and having a cylindrical side wall extending axially beyond said one end and terminating in a transverse end wall; a pump cylinder of circular cross-section secured in fluid tight relation in diametrically opposite holes in said side wall; said pump cylinder having an elongated central bore which is closed at one end of said pump cylinder and open through the other end; a piston inserted into the open end of said pump cylinder bore; a sheet metal clevis having a base secured by a welded area onto said end wall to extend diametrically thereacross in parallel relation to said pump cylinder and having upstanding portions providing a clevis pivot axially beyond said end wall; a link having one end pivotally connected to said clevis pivot; a lever pivotally connected at longitudinally spaced points thereof to the outer end portion of said piston and to the other end of said link; said pump cylinder having an inlet communicating the interior of said grease-containing cylinder with said bore when said piston uncovers said inlet during outward movement of said piston by swinging said lever away from said grease-containing cylinder; a check valve body having a cylindrical portion extending through aligned holes in said base and end wall remote from said welded area and extending through and secured in fluid tight relation in a cross bore of said pump cylinder adjacent the closed end thereof; said check valve body having shoulders at the ends of said cylindrical portion respectively engaging said base around the hole therein and said pump cylinder around said cross bore to retain said base against said end wall to prevent pulling apart of said base and end wall at said welded area upon application of large forces on said link as said lever is swung toward said grease-containing cylinder to move said piston inwardly toward said closed end to cover said inlet; said shoulder which engages said pump cylinder being defined by the radially outwardly deformed end of said cylindrical portion; said check valve body having a check valve therein through which grease is pumped to said pump outlet passage during movement of said piston toward the closed end of said pump cylinder.

4,077,495

ENERGY ABSORBER

Michael John Chase, Kidderminster, England, assignor to Imperial Metal Industries (Kynoch) Limited, Birmingham, England

Filed Apr. 12, 1976, Ser. No. 676,346
Claims priority, application United Kingdom, Apr. 17, 1975, 15965/75
Int. Cl.² F16F *7/12*
U.S. Cl. 188—1 C **15 Claims**



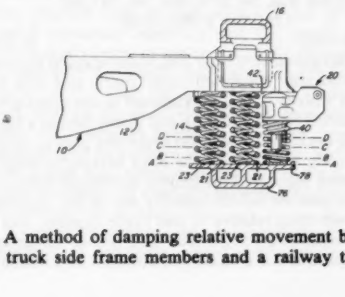
1. An energy absorber having first and second portions of different energy absorbing characteristics comprising a non-resiliently deformable, open-cell structure having cells partly filled with crushable material comprising void-forming members embedded in a matrix, the void-forming members being of substantially smaller dimensions than the cells of the structure, said open-cell structure projecting from said matrix whereby the filled portion of the structure forms one of said portions and whereby the projecting unfilled portion of the structure forms the other of said portions.

4,077,496

RAILWAY TRUCK MOVEMENT DAMPING

Donald Wiebe, Sewickley, Pa., assignor to A. Stucki Company, Pittsburgh, Pa.

Division of Ser. No. 538,735, Jan. 6, 1975, abandoned. This application Jun. 14, 1976, Ser. No. 695,803
Int. Cl.² B61F *5/06, 5/12, 5/24, 11/00*
U.S. Cl. 188—33 **6 Claims**



1. A method of damping relative movement between railway truck side frame members and a railway truck bolster

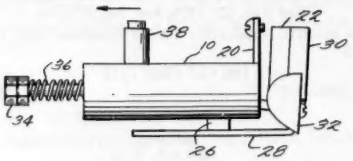
member, extending transversely between said side frame members, during movement of a loaded railway freight car assembly on a track comprising the steps of: applying substantially equal first hydraulic damping forces to said members adjacent each longitudinal end of said bolster member when said railway car assembly is normally operating on tangent track and when said railway car is operating at equilibrium speed; applying substantially equal second hydraulic damping forces to said members adjacent each longitudinal end of said bolster member when said railway car assembly is operating at low speed on superelevated track and in all instances of severe rocking; and said second hydraulic damping forces being greater than said first hydraulic damping forces.

4,077,497

YARN CLAMP

Ellis H. Jenkins, Lanett, Ala., assignor to West Point Pepperell, Inc., West Point, Ga.

Filed Apr. 30, 1976, Ser. No. 682,045
Int. Cl.[2] B65H *59/16;* D03D *45/50*
U.S. Cl. 188—65.1 **8 Claims**



1. A yarn clamp comprising:
a movable clamp body;
a jaw element connected in fixed relationship to one end of said body;
a shaft housed within said body and extending coaxially therewith, said shaft projecting from and extending beyond the opposite end of the body;
a compression spring surrounding the portion of the shaft extending beyond said body;
fixed support means secured to the portion of the shaft within said body and projecting through a slotted opening along said body intermediate its ends;
an additional jaw element connected to said support means and positioned to be contacted by said first-mentioned jaw element in accordance with displacement of the body by the spring relative to said shaft; and
means joined to the exterior of the body for receiving a force in opposition to that of the spring and for displacing the body relative to said shaft to separate said jaw elements.

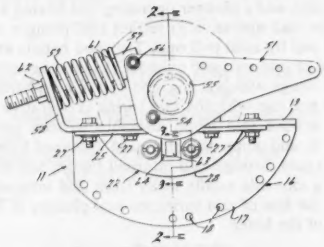
4,077,498

MECHANICALLY ACTUATED DISK BRAKE WITH SERVO ACTION

Donald Dean Brown, Thiensville, and Jere Sanders Culp, Menominee Falls, both of Wis., assignors to Kelsey-Hayes Co., Romulus, Mich.

Filed Aug. 24, 1976, Ser. No. 717,252
Int. Cl.[2] F16D *55/46*
U.S. Cl. 188—72.2 **11 Claims**

1. A self energizing spot type disk brake adapted to cooperate with a rotatably supported brake rotor, said disk brake comprised of a brake housing juxtaposed to the brake rotor, a brake pad carried by said housing and juxtaposed to a braking surface of the associated rotor, said brake pad having a braking area substantially smaller than the rotor braking surface, said brake pad being supported for limited movement from a normal retracted position axially, radially and in the direction of rotation of said rotor relative to said brake housing, said support of said brake pad being effective to permit movement of said brake pad in either a clockwise direction of rotation or a counterclockwise direction of rotation relative to said brake housing, cam means interposed between said brake pad and said brake housing for exerting a force on said brake pad in an axial direction when said brake pad moves relative to said brake housing in either the radial direction or either of said



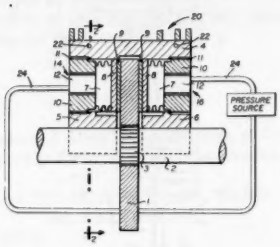
rotary directions, and actuating means for moving said brake pad substantially only in a radial direction whereby said cam means actuates said brake pad axially into engagement with the brake rotor and for generating a self energizing effect upon said brake pad upon its rotation with the rotor regardless of the direction of rotation of the associated rotor.

4,077,499

DISC BRAKE ACTUATOR

Martin Baram, 13 Svanholmvej 2660, Brøndby Strand, Denmark

Filed Dec. 9, 1976, Ser. No. 749,210
Claims priority, application Denmark, Dec. 10, 1975, 5591/75
Int. Cl.[2] F16D *55/228*
U.S. Cl. 188—72.4 **8 Claims**



1. In a disc brake assembly of the kind having a clamp housing fixedly mounted to a body which surrounds a rotatable member whose rotational movement is to be restrained in response to operation of said brake assembly, said rotatable member having a substantially planar rotatable disc fixedly joined thereto perpendicularly to the axis of rotation thereof, said disc being arranged to operatively rotate in the vicinity of said clamp, said clamp over-extending a portion of said disc and including at least one brake assembly operative to frictionally engage said disc in response to the application of pressurized fluid thereto, said brake assembly comprising:
an elastically deformable, self-supporting spring pipe arranged to be fixedly mounted only at one end thereof to said clamp for linearly expansible movement within an axially extending opening provided in said clamp, said opening in said clamp being disposed so as to enable said spring pipe to expand axially toward said rotatable disc while exposing an axially extending portion of said spring pipe to the exterior of said clamp for enabling outside air to operatively flow past said spring pipe for providing cooling within said clamp by the removal of heat therefrom;
a pressure head fixedly joined to and operatively sealing the other end of said spring pipe and slidable in said opening;

a frictional coating disposed between said pressure head and said disc brake; and

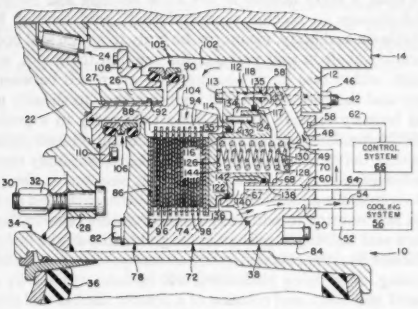
means connected to said one end of said spring pipe for communicating fluid pressure from an outside source to said spring pipe to produce said expansible movement wherein said pressure head forcibly bears against said frictional coating and said disc to retard the movement of said disc in response to said fluid pressure when said brake assembly is operated, and said spring pipe maintains a predetermined clearance between said pressure head and said disc to permit said disc to move freely in the vicinity of said housing when said brake assembly is not operated, whereby friction temperatures normally present within said brake assembly can be decreased.

4,077,500

ANNULAR SINGLE PISTON BRAKE ARRANGEMENT

Donald A. Hickman, Sr., Decatur; John H. Hrabak, Pana, and Paul C. Rosenberger, Decatur, all of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Continuation of Ser. No. 608,294, Aug. 27, 1975, abandoned.
This application Nov. 26, 1976, Ser. No. 745,506
Int. Cl.[2] F16D *65/14*
U.S. Cl. 188—106 P **6 Claims**



1. An annular single piston brake arrangement, for selective holding engagement of a rotatable member of a drive train, comprising:

a support structure;

an annular brake piston mounted for axial movement within the support structure and defining therewith a service brake actuation chamber, a parking brake retraction chamber, and a separate spring chamber;

spring means disposed within the spring chamber and connected to the support structure for biasing the brake piston concentrically toward peripheral brake holding engagement of the rotatable member;

retraction means for supplying fluid to the parking brake retraction chamber for biasingly overcoming the force of the spring means and holding the brake piston in a disengaged position;

actuating means for supplying fluid to the service brake actuation chamber for selectively biasing the brake piston concentrically toward peripheral brake holding engagement of the rotatable member;

seal means disposed intermediate the support structure and the rotatable member for defining an internal chamber therebetween;

means for continually supplying a cooling fluid to the internal chamber for cooling the brake arrangement, with such fluid acting to bias the brake piston toward the disengaged position; and

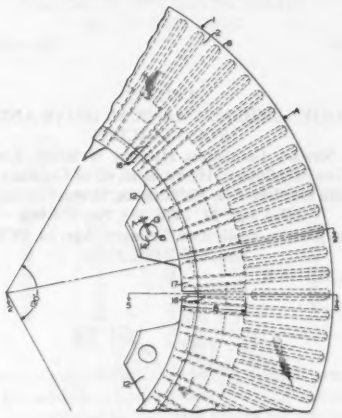
means for communicating a fluid to the separate spring chamber for biasing the brake piston toward engagement in opposition to the effect of the cooling fluid in the internal chamber urging the brake piston toward disengagement.

4,077,501

DISC FOR DISC BRAKE UNIT

Robert B. Morris, North Huntingdon, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Jan. 21, 1977, Ser. No. 760,963
Int. Cl.[2] F16D *65/12*
U.S. Cl. 188—218 XL **5 Claims**



1. For use in a disc brake unit, an annular braking disc comprising:

(a) a pair of spaced-apart braking members each having extending from one side thereof a flat annular braking surface for braking engagement by a braking means,

(b) a first plurality of arcuately spaced-apart radially-extending fins disposed between said pair of spaced-apart braking members, each spaced-apart fin having substantially the same radial length as the radial length of said pair of braking members and its respective opposite ends formed integral with said spaced-apart braking members,

(c) a second plurality of arcuately spaced-apart radially extending fins, the inner ends of which terminate at the inner ends of said first plurality of fins, each fin having a radial length that is less than the radial length of said first plurality of arcuately spaced-apart fins and each so disposed midway between said pair of spaced-apart braking members that its respective opposite sides are integral with the adjacent sides of the adjacent pair of said first plurality of fins whereby each fin of said second plurality of fins is disposed midway the length of the adjacent pair of fins integral therewith, a certain chosen number of the plurality of alternately spaced short and long fins providing one of several arcuate segments, the length of each segment being such that each end of each arcuate segment is spaced apart from the adjacent end of the adjacent arcuate segment whereby there is thus formed between the adjacent ends of each adjacent pair of segments a radial outwardly extending slot, the length of which is substantially equal to the length of the shorter fins, and,

(d) a plurality of inwardly extending securing lugs, each lug being integral with one of said several arcuate segments and, wherein the improvement comprises, an aperture in each lug, the inner periphery of which constitutes two spaced-apart semicircles having the same radius, the centers of said radii being spaced apart one from the other a chosen distance on a radial line passing through the center of said annular braking disc,

(e) said annular braking disc having formed therein said plurality of arcuately spaced-apart radially outwardly

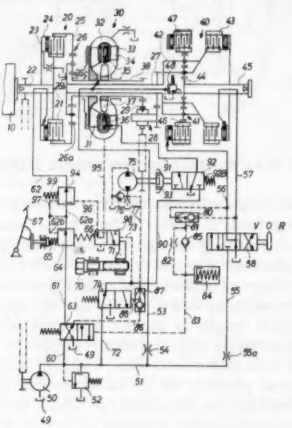
extending slots that so cooperate with said apertures in said lugs as to enable both radial and arcuate thermal expansion and contraction of that portion of said annular braking disc extending between each pair of adjacent radially outwardly extending slots independently of the remaining portion of said annular braking disc thereby preventing thermal cracking of said disc.

4,077,502

HYDRODYNAMIC-MECHANICAL DRIVE AND BRAKE FOR VEHICLES

Martin Nitsche, Gerstetten; Hellmut Weinrich, Konigsbronn, and Uwe Mühlberger, Heidenheim, all of Germany, assignors to Voith Getriebe KG, Heidenheim, Brenz, Germany

Filed Apr. 21, 1976, Ser. No. 678,906
Claims priority, application Germany, Apr. 24, 1975, 2518186
Int. Cl.[2] B60K *29/02*
U.S. Cl. 192—4 B **21 Claims**



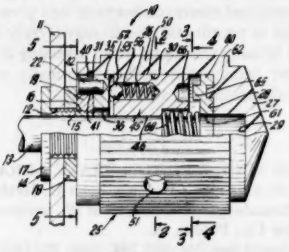
1. In a hydrodynamic-mechanical drive, particularly for vehicles, a combination comprising a prime mover; a counter-rotating hydrodynamic torque converter including a driving member having an inlet side and arranged to effect circulation of fluid in a predetermined direction, a driven member disposed in the region of said inlet side and arranged for substantially axial flow of fluid therethrough, and at least one guide blade ring disposed between said members, as considered in the direction of fluid flow between said members, to reverse the direction of fluid circluation which is effected by said driving member; an input clutch having a primary portion receiving torque from said prime mover and a secondary portion arranged to receive torque from said primary portion with varying degrees of slip and to transmit torque to said driving member; rotary take-off means; a reversing gearing disposed between said driven member and said take-off means and including first and second motion transmitting devices respectively engageable to rotate said take-off means in first and second directions; and a control system including a component operable in response to a braking command to change over said reversing gearing to thereby effect operation of said converter in the counterbraking range, and means for increasing the degree of slip of said primary portion with respect to said secondary portion in resonse to said braking command.

4,077,503

KNOB AND CONTROL SHAFT ASSEMBLY

Lester Lieberman, Kings Point, and Ralph Oddo, Dix Hills, both of N.Y., assignors to Jan Hardware Manufacturing Co., Inc., New York, N.Y.

Filed Aug. 11, 1976, Ser. No. 713,413
Int. Cl.[2] G05G *1/02*; F16D *67/02*
U.S. Cl. 192—18 R **19 Claims**



1. A knob assembly comprising a knob housing having a tubular wall open at one end and closed at the other end by an end wall, a body housed in the knob housing and having an axial passage to receive a control shaft, said housing being slidable on said body, means on the body to attach said body to a control shaft in said passage, for rotation therewith, spring means within said knob housing and interposed between the body and the end wall of said knob housing, to slidably move said housing relative to said body outwardly to a predetermined extended position, said knob housing, in said extended position, being rotatable on and relative to said body through a substantial angle and without rotating said body, disengageable cooperating lock means on said knob housing and body, to lock said housing to said body against rotation relative thereto, when said housing is pushed-in longitudinally of the body in a direction to compress said spring means, so that rotation of said housing, after being pushed-in, will be accompanied by rotation of said body, and rotation of a control shaft in said passage and attached to said body, together with said body, and whereby upon relieving push-in pressure on the housing, said housing will be moved in an opposite direction by said spring means to disengage said lock means, a fixed member disposed in said knob housing, said body being interposed between said fixed member and end wall, and cooperative means on said body and fixed member and disposed within said knob housing and between said body and fixed member, independently of said spring means, and independently of a control shaft being received within said axial pressure in said body and of attachment of such shaft to said body by said means on the body to attach said body to said control shaft, to impose a friction drag on said body to retard rotation of said body relative to said fixed member upon pushing-in said knob housing and rotating said knob housing while said knob housing is in pushed-in condition.

4,077,504

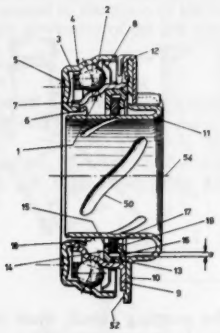
SELF-CENTERING CLUTCH THRUST BEARING

Horst Manfred Ernst, Eltingshausen; Armin Olschewski, Schweinfurt; Rainer Schurger, Schwanfeld; Lothar Walter, Schweinfurt; Manfred Brandenstein, Aschfeld, and Erich Burkl, Stammheim, all of Germany, assignors to SKF Industrial Trading & Development Co. B.V., Jutphaas, Netherlands

Filed Feb. 13, 1976, Ser. No. 657,977
Claims priority, application Germany, Feb. 20, 1975, 2507194
Int. Cl.[2] F16D *23/14*
U.S. Cl. 192—98 **20 Claims**

1. In a self-centering clutch thrust bearing having a sleeve with a radially extending first flange, a rolling bearing assembly having first and second ring-shaped members, and a plurality of rolling elements between said first and second members,

said first ring-shaped member having a second radially extending flange adjacent said first flange, means restraining substantial axial and circumferential movement between said first and second flanges while enabling limited radial movement therebetween; the improvement comprising means for releasibly



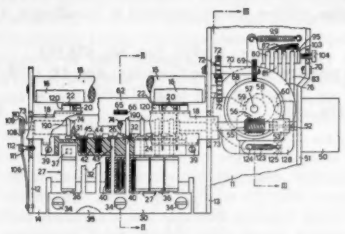
maintaining the relative radial positions between said first ring-shaped member and said sleeve, said maintaining means comprising annular disc means, and an annular member having a radially extending recess, said annular disc means extending radially into said recess, said annular member comprising means exerting an axial force on said annular disc means.

4,077,505

PRINTING DEVICE FOR CALCULATING, ACCOUNTING AND SIMILAR PRINTING MACHINES

Nicolo Giolitti, Ivrea (Turin), and Michele Bovio, Banchette (Turin), both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea (Turin), Italy

Filed Jun. 23, 1976, Ser. No. 698,923
Claims priority, application Italy, Jun. 26, 1975, 68643/75
Int. Cl.[2] B41J *3/04*
U.S. Cl. 197—1 R **26 Claims**



1. A dot matrix printing device cooperating with an associated recording sheet, comprising:

a platen;

a plurality of parallel, substantially rigid bars disposed in front of said platen;

guide means for moving said bars transversely with respect to said platen along a printing line to define individual dot printing positions thereon;

a plurality of electromagnets associated with said rigid bars, each one of said electromagnets having an actuatable core fixedly mounted with respect to said platen and an armature mounted transversely stationary with respect to said platen;

means for selectively actuating each said core for longitudinally moving each said armature from a rest position to an actuating position; and

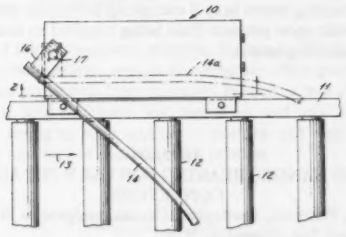
connecting means for individually connecting each armature of said electromagnets with a corresponding one of said bars, said connecting means allowing said bars to move transversely with respect to the corresponding armatures in response to said transverse movement of said bars and transmitting said longitudinal movement of said armatures to said bars to strike said bars against said platen for the printing of a plurality of dots on the recording sheet.

4,077,506

DIVERTER ASSEMBLY

Herman Schlottmann, Hamburg, Mich., and John G. Melchior, Toledo, Ohio, assignors to Temcor, Inc., Brighton, Mich.

Filed Oct. 22, 1974, Ser. No. 516,976
Int. Cl.[2] B65G *15/00*
U.S. Cl. 198—367 **10 Claims**



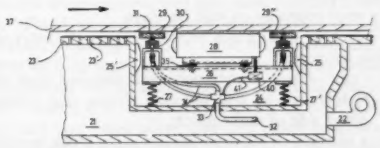
1. A diverter mechanism comprising a diverter arm with a mounting for movement between non-diverting and diverting positions, reversible power actuated means for effecting said movement including yieldable linkage for moving said diverter arm to said diverting position and including terminal linkage for resisting reaction pressure against said diverter arm in its final diverting position, said yieldable linkage including a resilient means for actuating said linkage with a predetermined limited force insufficient to cause diverting action during the entire transitional portion of movement of said diverter arm, and said yieldable linkage including means to release said resisting terminal linkage through reversal of said power actuated means.

4,077,507

METAL SHEET CONVEYOR WITH LINEAR ELECTRIC MOTOR AND GROUND-EFFECT SHOE

Jean Pierre Michel Boquet, Gif-sur-Yvette, France, assignor to Bertin & Cie, Plaisir, France

Filed Dec. 11, 1975, Ser. No. 640,026
Claims priority, application France, Dec. 16, 1974, 74 41326
Int. Cl.[2] B65G *35/00*
U.S. Cl. 198—619 **6 Claims**



1. An apparatus for propelling a metal sheet in a predetermined progress direction with respect to a stationary support system, of the kind operating by means of a motor-and-cushion assembly comprising

(i) a linear induction motor adapted to subject said metal sheet to an electric field which has the twofold effect of developing between said motor and said sheet both an attraction force component normal to said progress direction and a propulsion force component parallel to said progress direction,

(ii) a pressure fluid cushion generating means extending adjacent said sheet with but a slight clearance with respect thereto, for building up a pressure fluid cushion in said clearance and against said sheet in antagonism with said attraction force component, to keep said sheet and said motor-and-cushion assembly apart from each other and in noncontact relationship, and

(iii) connecting means between said stationary support system and said motor-and-cushion assembly allowing relative displacement of said assembly normal to said progress direction while restraining said assembly against relative displacement parallel to said progress direction,

wherein the improvement comprises

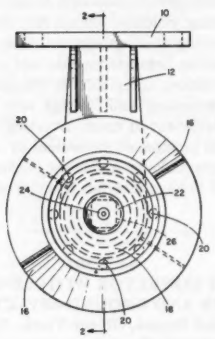
(iv) an electric energizing circuit for said linear induction motor, and cushion fluid supply pressure responsive switching means in said energizing circuit for making said circuit upon pressure fluid being supplied to said cushion generating means.

4,077,508

SEALED HANGER BEARING FOR USE WITH ABRASIVE CONVEYORS

John A. Pedersen, Burlington, Canada, assignor to Wheelabrator-Frye Inc., Hampton, N.H.

Filed Oct. 15, 1976, Ser. No. 732,931
Int. Cl.² B65G *33/00*
U.S. Cl. 198—666 **6 Claims**



1. An enclosed hanger bearing construction for connecting two rotary conveyors comprising:

(a) an overhead bearing support,

(b) roller bearings and means for securing said bearings to said support,

(c) a shaft rotatable on said bearings,

(d) means for sealing said bearings against the entry of abrasive including:

i. a pair of hollow cylinders each disposed over approximately half of said securing means, one cylinder on either side of said support,

ii. a plurality of felt seals packed in the space between said securing means and said cylinders,

iii. magnetic seals disposed at the point where the inner ends of said cylinders terminate to permit connection between said support and said securing means for preventing the entry of magnetic abrasive thereinto.

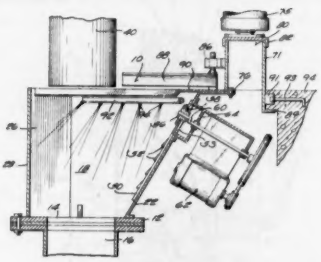
(e) means for connecting said shaft to said rotary conveyors including an adapter plate and bearing segment located over the outer end of each of said cylinders, said segments connected to said plates and having means for receiving and securing said shaft therein, each of said plates having means for attachment to one of said rotary conveyors.

4,077,509

MANURE PUMP

Vernon R. Berg, Jr., 413 W. Park St., Marshfield, Wis. 54449

Filed May 27, 1976, Ser. No. 690,472
Int. Cl.² B65G *25/04*
U.S. Cl. 198—747 **7 Claims**



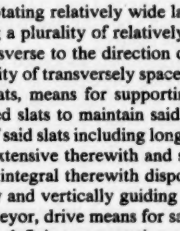
1. Apparatus for pumping animal waste from a livestock facility to a remote storage area comprising a pumping chamber having an upwardly open inlet, the improvement comprising a hopper located above and surrounding said inlet, said hopper having first and second spaced vertical walls and a downwardly inclined third wall interconnecting said first and second walls, an agitator plate substantially spanning said inclined wall, means for supporting said agitating plate on said inclined wall for reciprocating movement thereon, and means for reciprocating said agitator plate to induce flow of material in contact therewith into said inlet, said last named means comprising a bearing connected to said agitation plate, a crank arm having a shank portion journaled in said bearing block, and means for rotating said crank arm about an axis generally perpendicular to said agitating plate to afford agitating and orbital movement of said agitator plate relative to said crank arm.

4,077,510

GUIDE MECHANISM FOR CONVEYOR SYSTEM

Hugo Stefan Müller, Oetingerstrasse 9, Nordlingen, Germany (8860)

Filed Apr. 2, 1976, Ser. No. 673,197
Claims priority, application Germany, Apr. 12, 1975, 2516151
Int. Cl.² B65G *15/62*
U.S. Cl. 198—840 **5 Claims**



1. An endless rotating relatively wide lattice type conveyor system comprising a plurality of relatively long slats disposed in a direction transverse to the direction of movement of said conveyor, a plurality of transversely spaced endless belt means secured to said slats, means for supporting and guiding said belts and associated slats to maintain said slats in tension and prevent sagging of said slats including longitudinally extending ribs generally coextensive therewith and secured to said belts having extensions integral therewith disposed within said belt means for laterally and vertically guiding said ribs and associated belt and conveyor, drive means for said conveyor including a drive pulley defining cooperating guide tracks for said extensions and in form-locking engagement therewith, a guide

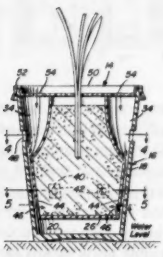
means assembly for said extension means located within the area embraced by said belt means for positively guiding the conveyor during its travel, said guide means defining sliding surfaces extending parallel with the plane of the conveyor belt throughout a large majority of its travel to support the active portion of the belt means and prevent sagging of the belt on its return run to the active portion and also defining guide surfaces generally normal to the plane of the conveyor for controlling transverse movement of the belt means.

4,077,511

TREE AND SHRUB FEEDER

Michael B. Mosijowsky, R.D. No. 2, Barnes Rd., Vermilion, Ohio 44089

Filed Mar. 22, 1976, Ser. No. 669,088
Int. Cl.[2] A01G *29/00*; B65D *83/00*
U.S. Cl. 206—.5 **9 Claims**



1. A tree and shrub feeder including an upwardly opening receptacle including upstanding side wall portions and closed at its lower end by means of a first bottom wall, said receptacle including wall means therein defining an upwardly opening compartment in said receptacle closed at its bottom by means of a second bottom wall spaced above said first bottom wall, said wall means and said side wall portions defining a plurality of peripherally spaced upstanding passages outwardly of said compartment and inwardly of said receptacle, said passages opening upwardly at their upper ends into the upper portion of said receptacle and downwardly at their lower ends into the space between said bottom walls, said wall means of said compartment including lower openings therethrough opening into lower portions of said passages, and said feeder including openings in said side wall portions and upper openings in said wall means of said compartment opening outwardly from the interior of said compartment above said lower openings to the exterior of said receptacle with said openings in said side wall portions and said upper openings not intersecting and being out of fluid communication with said passages, whereby liquid flowing outwardly from the interior of said compartment through said openings in said side wall and said upper openings will be prevented from mixing with liquid flowing downwardly through said passages and into said compartment through said lower openings, a closure wall closing the upper end of said receptacle, said closure wall defining an upwardly opening rain catch basin and having openings formed therethrough registered with the upper ends of said passages, said receptacle being adapted to receive water-soluble plant nutrient therein.

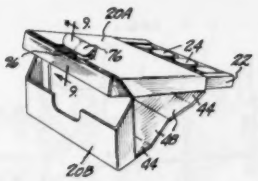
4,077,512

COMBINATION SHIPPING AND DISPLAY CONTAINER

George N. Heaton, Elkhart, Ind., assignor to Claro Laboratories, Inc., South Bend,, Ind.

Filed Oct. 7, 1976, Ser. No. 730,169
Int. Cl.[2] B65D *5/52, 13/06*
U.S. Cl. 206—45.2 **5 Claims**

1. A combination shipping and display container comprising an enclosure having a top panel, a back panel and side panels defining a tubular part, and end panels and retainer flaps projecting from the ends of said back panel, said top and side panels being cut transversely intermediate the length thereof and said back panel being creased transversely between the ends of said side panel cuts whereby said tubular enclosure part may be folded to provide angularly disposed tubular easel and strut portions, means connecting the opposite retainer flaps to



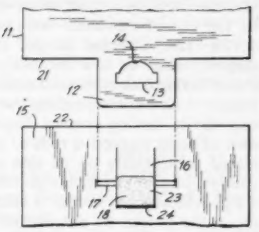
maintain a folded enclosure position, the cut in said top panel including end portions and an intermediate offset portion defining a tab projecting from said easel portion, a tray slideably received in said enclosure, and means on said tray for interlockingly engaging with said tab to position and support said enclosure and tray in easel forming relation.

4,077,513

LATCHING ARRANGEMENT FOR CONNECTABLE PANELS

Daniel A. Ferrara, Jr., New Milford, Conn., assignor to Ferrara-Benedek Design, Inc., New York, N.Y.

Filed Oct. 20, 1976, Ser. No. 734,055
Int. Cl.[2] B65D *5/64*
U.S. Cl. 206—106 **7 Claims**

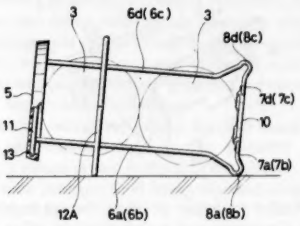


1. A latching arrangement for connectable panels comprising first and second panels, said first panel adapted to overlie a portion of said second panel in a latched position, said first panel having a leading edge and a first tongue extending therefrom beyond said leading edge, said first tongue including a first slot therein having a transversely extending longitudinal axis and a width, said second panel having an edge positioned beneath said first panel when said first panel is in overlying relationship with respect to said second panel and including a second tongue and a second slot, said second tongue being located wholly within said second panel and having a longitudinal extent directed away from said edge of said second panel, said second slot having a transversely extending longitudinal axis and a width, said transversely extending longitudinal axis of said second slot being generally perpendicular to the longitudinal extent of said second tongue, and said second slot spanning said second tongue and being positioned in said second panel wholly within the longitudinal extent of said second tongue.

4,077,514
BALL HOLDER

Masaharu Kubokawa, No. 3-11-8 Minami-Nagasaki, Toshima-ku, Tokyo, Japan

Filed Nov. 12, 1975, Ser. No. 631,393
Int. Cl.[2] B65D *85/00*
U.S. Cl. 206—315 B 1 Claim



1. A normally vertically upstanding ball holder for tennis balls comprising:

a main body (**4**) including four relatively slender metal rods (*6a* - *6d*) equiangularly arranged around a longitudinal axis, said body being provided at the top end thereof with an opening (**2**) permitting a ball to pass therethrough and four supporting members (*7a* - *7d*) disposed at the bottom of said body;

four looped legs (*8a* - *8d*) attached to said supporting members, respectively, each of said looped legs being formed at the bottom of said holder by bending each of said rods downwardly and radially outwardly;

an enclosing means (**11**) attached around said rods in the vicinity of said opening (**2**), and

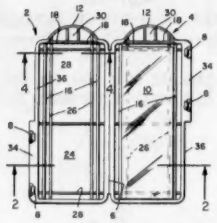
a bottom support plate (**10**), said supporting members having inner ends connected to said bottom plate (**10**), said bottom plate having on the periphery thereof four depressions for receiving and being fixedly connected to respective ends of said supporting members, said bottom plate having a central aperture in which the lowermost ball in the ball holder can partially project, a cap (**5**) removably fitted on the top end of said main body, and a square enclosing device (**12A**) attached around said rods and disposed relatively close to said enclosing means, said enclosing device having four sides each making contact at the center thereof with a corresponding one of said rods, said enclosing device having corners disposed equidistantly between adjacent respective rods so that when the holder is placed horizontally on its side on a support surface, it can rest on one of said corners and on two of said lopped legs whereby the holder is stably supported and the balls in the holder do not contact the support surface.

4,077,515
MEDICAL SLIDE CASE WITH HINGED MOLDED SECTIONS

Dell Shoberg, 18748-2 Bryant St., Northridge, Calif. 91324

Filed Oct. 6, 1976, Ser. No. 730,124
Int. Cl.[2] B65D *85/48*
U.S. Cl. 206—456 3 Claims

1. In a case for the storage and transport of medical slides, generally planar sections of molded material integrally joined along one edge aspect of the respective sections, said juncture comprising a thin linear hinge element accommodating reversible movement of the sections from a planar case open condition to a planar case closed flat condition of the sections to thereby encapsulate a contained medical slide, each section comprising annular wall means having a planar upper edge generally defining a slide receiving cavity in each section, the cavities in each section being in congruent mirrored relation and adapted to receive said slide when the sections are in case open condition, the upper edges of the respective wall means on the respective sections being in close facing relation with each other when the sections are in closed condition, said wall means on at least one of said sections defining a second cavity adjacent said slide receiving cavity, said wall means having an interruption in the area of adjacency between the slide receiving cavity and the second cavity to accomodate finger insertion and edge engagement with a case received slide facilitating insertion and removal thereof, clasp means on the respective sections to maintain said sections in closed relation to each

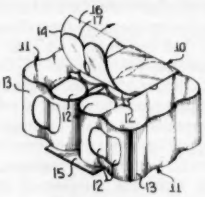


other, said clasp means comprising a web on each section formed in the plane of the section and extending outwardly from the annular wall means along an edge aspect thereof opposite the hinge element, each web on each section including an enlarged outward projection adapted for thumb engagement by the user for the application of rotative force on each section and about the hinge element to accomodate easy opening of the case, and flexible hook means carried by the web on each section for locking cooperation with a segment of the web on the other section.

4,077,516
SHRINK WRAP PACKAGE WITH TEAR STRIP

Joseph W. Duerr, Rockleigh, N.J., assignor to Ganz Brothers, Inc., Bergenfield, N.J.

Filed May 17, 1976, Ser. No. 687,091
Int. Cl.[2] B65D *65/26*
U.S. Cl. 206—602 7 Claims



1. An article package comprising at least two packages each including a plurality of articles encased in a casing of plastics material, said packages being in aligned side-by-side relation, and strips of material each extending across said packages and being bonded to said casings, at least one of said strips having an extension forming grip means for removing said one strip from said article package together with portions of said casings to effect opening of said packages.

4,077,517
FURNITURE KIT

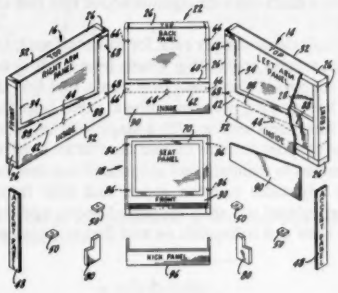
Charles Hilemn, 21 E. Rocket Cir., Park Forest, Ill. 60466

Filed Mar. 14, 1977, Ser. No. 777,135
Int. Cl.[2] B65D *85/00, 85/54;* A47C *7/00*
U.S. Cl. 206—577 4 Claims

1. A furniture kit comprising components for the assembly of an upholstered furniture piece, said kit including:

a. Four rectangular frame members;

b. Two of said frames defining side arm panels of a chair each having horizontal reinforcing member for affixation of a foam cushion and fabric material thereto, said member also being adapted for fixation of a third panel between said first two panels to define a seat;



c. Said fourth frame member being adapted for affixation to said side arm panels to define a back for said seat;

d. A cover panel mounted upon said frame members, said cover carrying indicia for the positioning of foam and fabric thereon and affixing means for mounting said foam thereto.

4,077,518

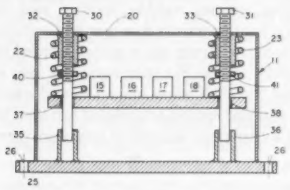
SENSOR TRANSPORT SYSTEM

Robert L. Kisslinger, University City; Benny B. Barnes, Kirkwood, and Frederick L. Tuttle, Florissant, all of Mo., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Apr. 12, 1977, Ser. No. 786,908

Int. Cl.[2] B65D *81/10, 85/38*

U.S. Cl. 206—583 **11 Claims**



1. A resilient remotely securable mounting for fragile instruments and other objects comprising:

a form to which said objects are permanently secured;

a housing and means resiliently suspending said form therein selectively spaced therefrom to permit movement in response to excursions from shocks;

means extending into said housing and aligned with said resiliently suspending means for limiting and arresting lateral and vertical movement of said form; and

a transport casing and means for resiliently suspending said housing therein during transport,

whereby said objects are protected during handling and installation by being resiliently suspended in said housing and during shipment by resilient suspension of said housing in said casing, and said objects are permanently secured at the installation site by operation of said means limiting and arresting lateral and vertical movement.

4,077,519

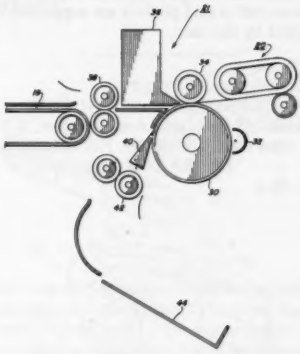
CURL DETECTOR AND SEPARATOR

Charles L. Huber, Marion, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 28, 1977, Ser. No. 781,891

Int. Cl.[2] B65H *29/58*

U.S. Cl. 209—74 R **6 Claims**



1. A reproduction machine adapted to produce copies on sheet material fed through a plurality of processing stations in the machine, the machine having a sheet curl detection device thereon, the sheet curl detecting device comprising:

a rotatable curl detector roll adapted for contact with each sheet fed through the machine;

charging means adapted to provide an electrical charge on said rotatable roll for electrostatically attracting the fed sheets thereto;

curl detector vacuum stripping means adapted to strip sheets from said roll after the sheets have been attracted thereto to enable passage of the stripped sheets to subsequent processing stations in the machine, and;

mechanical stripping means downstream from said vacuum stripping means to physically remove those sheets from said roll that are not removed by said vacuum stripping means, failure of said vacuum stripping means to strip a sheet being indicative of a sheet curl in the same direction as the curvature of said roll.

4,077,520

RACKS FOR CARDS AND THE LIKE

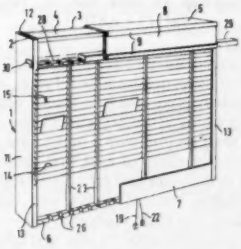
Sydney Samuel Stevenson, "Oakland", Knoll Rd., Godalming, Surrey, England

Filed Nov. 26, 1975, Ser. No. 635,390

Claims priority, application United Kingdom, Nov. 27, 1974, 51443/74

Int. Cl.[2] A47F *7/00*; G09F *1/10*

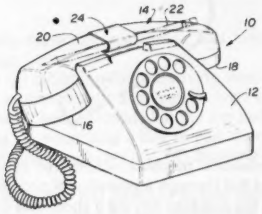
U.S. Cl. 211—55 **9 Claims**



1. A vertical rack for the storage of cards or the like, comprising: a casing, means defining within said casing a plurality

of pockets having forwardly facing openings at their upper ends arranged one above the other at the front of said casing and overlapping one behind the other within said casing, each said pocket having a front, bottom and back formed of a continuous sheet of flexible material, means for fixedly supporting front edges of said sheets at a bottom of said pocket openings and means for raising and lowering the rear edges of said sheets to adjust the depths of said pockets whereby the bottom edges of the cards inserted in said pockets are supported by pockets at levels decided by the user.

4,077,521
TELEPHONE PENCIL HOLDER
James G. Alkins, 357 St. Marks Ave., Freeport, N.Y. 11520
Filed Dec. 2, 1976, Ser. No. 746,858
Int. Cl.[2] A47F 7/00
U.S. Cl. 211—69.1 **5 Claims**

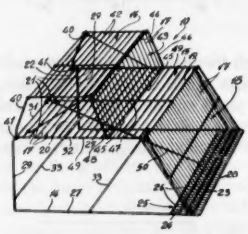


1. A holder for a pencil or the like having an operative supported position on a handle of a telephone handset, said holder comprising a body fabricated of flexible construction material having at one end thereof a cooperating pair of handle-engaging walls in opposing face relation to each other for engagement with opposed walls of a handle of a telephone handset, a wall on said body interconnecting said opposed handle-engaging walls in spaced relation to a telephone handset handle, and an encircling wall configuration at the other end of said body formed by said body bounding a generally cylindrically shaped compartment oriented longitudinally of a telephone handset handle as a contiguous extension of one end of one of said opposed walls with said encircling wall defining an opening to frictionally grip a pencil or the like projected therethrough, whereby a gripped pencil is conveniently held to a handset and is accessible for removal preparatory to use but otherwise remains supported in an uninterfering position on the side of a telephone handset handle during use thereof and a snap-fit of said walls is provided incident to the positioning of a telephone handset handle in an interposed position between said walls.

4,077,522
ADJUSTABLE DISPLAY RACK
Antoine Trubiano, 1410 - 7th Ave., Pointe aux Trembles, Quebec, Canada
Filed Sep. 15, 1976, Ser. No. 723,667
Int. Cl.[2] A47F 5/13
U.S. Cl. 211—175 **11 Claims**

1. An adjustable display rack for foodstuff such as produce or the like articles comprising a base frame, a first articulated top shelf supported above said base frame, said first articulated top shelf having a hinged connection at a rear edge thereof and a hinged front shelf section with a hinge joint extending across an article support surface of said first articulated top shelf, support means to maintain said articulated top shelf in a predetermined adjustable position above said base frame, and a second articulated top shelf supported above said first articulated top shelf and collapsible on said first articulated top shelf behind its front shelf section in a substantially flat condition whereby articles may be positioned over the collapsed second articulated top shelf, said second articulated top shelf having an article support surface and a hinged front shelf section with a hinge joint extending across its article support surface, a connecting frame in a rear portion of said second articulated top shelf, said connecting frame being angularly formed and having a bottom hinge connection secured on an axis common with said hinge connection at said rear edge of said first articulated top shelf, and means to maintain said second articulated top shelf in a fixed elevated position above said first articulated top shelf.

11. An adjustable display rack for foodstuff such as produce or the like articles comprising a base frame, a first articulated top shelf supported above said base frame, said first articulated top shelf having a hinged connection at a rear edge thereof and a hinged front shelf section with a hinge joint extending across an article support surface of said first articulated top shelf, support means to maintain said articulated top shelf in a predetermined adjustable position above said base frame, and a second articulated top shelf supported above said first articulated top shelf and collapsible on said first articulated top shelf

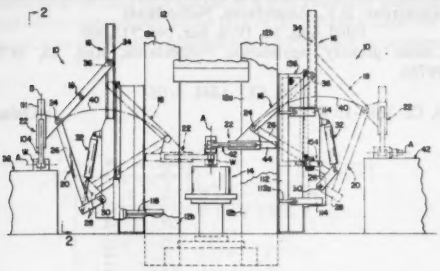


behind its front shelf section in a substantially flat condition whereby articles may be positioned over the collapsed second articulated top shelf, said second articulated top shelf having an article support surface and a hinged front shelf section with a hinge joint extending across its article support surface, a connecting frame in a rear portion of said second articulated top shelf, and means to maintain said second articulated top shelf in a fixed elevated position above said first articulated top shelf, said base frame having at least two parallel extending spaced-apart rod-like members interconnected at a front end by a transverse integral rod-like section, said two rod-like members being bent upwardly at a rear end and extending to a free end, a transverse hinge rod member secured between said free end of said two rod-like members, said rear edge of said first articulated top shelf being hinged to said transverse hinge rod member, and said second articulated top shelf further being hinged along a rear edge thereof to said transverse hinge rod member.

4,077,523
VERTICALLY SWINGING ARTICLE TRANSFER APPARATUS
Edwin A. Spanke, Oak Forest, Ill., assignor to Gulf & Western Manufacturing Company, Southfield, Mich.
Filed Mar. 1, 1976, Ser. No. 662,728
Int. Cl.[2] B65G 47/90
U.S. Cl. 214—1 BD **15 Claims**

1. A mechanism for transferring a workpiece between first and second spaced apart locations comprising, support means between said locations, arm means, means slidably and pivotally interengaging said arm means and said support means, a workpiece holder connected to said arm means for movement therewith and against movement relative thereto, said workpiece holder and a workpiece held thereby having axes of orientation, and means to slidably and pivotally displace said arm means relative to said support means to transfer said workpiece holder and said workpiece held thereby between said

first and second locations, said sliding and pivotal displacement of said arm means rotating said axes of orientation during said



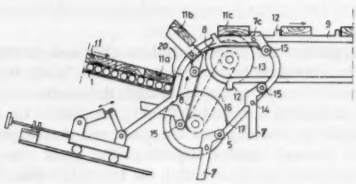
transfer to change the orientation of said axes between said first and second locations.

4,077,524

APPARATUS FOR SEQUENTIALLY FORWARDING BODIES TO A CONVEYER

Alpo Rysti, Frisansintie 22, 02240 Espoo 24, Finland

Filed May 19, 1976, Ser. No. 688,030
Int. Cl.² B65G *59/00*
U.S. Cl. 214—8.5 A **10 Claims**



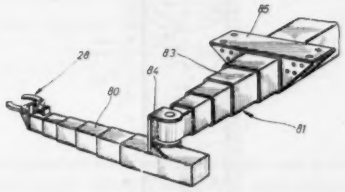
1. In an apparatus which includes a conveyer means to which elongated bodies, such as beams, timber, planks, or the like, are to be fed one after the other from an uninterrupted layer of said bodies wherein the bodies are arranged in a row extending transversely of the row and directly engaging each other, support means supporting the layer of bodies in a condition according to which the row of bodies is urged forwardly with an end body situated at the leading end of the row being engaged by the next body which in turn is engaged by the third body, and so on, stop means situated adjacent said support means for temporarily engaging the end body at the leading end of the row, when said stop means is in an initial position thereof, to temporarily prevent forward movement of the layer of bodies, moving means operatively connected with said stop means for displacing the latter from said initial position thereof away from the end body at the leading end of the row to release the end body for movement away from the next body so as to create at least a small clearance between said end body and the next body, and for returning said stop means back to said initial position thereof, and lifting means situated adjacent said support means, said stop means, and said conveyer means for lifting said end body away from said layer of bodies while but not before said clearance exists and depositing the lifted body on said conveyer means, said stop means when returned by said moving means to said initial position engaging the next body when it occupies the position previously occupied by said end body, said moving means moving said stop means repeatedly away from and back to said initial position thereof while said lifting means operates in synchronism with said moving means to repeat the above operations on the bodies of said layer which successively reach the position at the leading end of the row occupied initially by said end body.

4,077,525

DERRICK MOUNTED APPARATUS FOR THE MANIPULATION OF PIPE

Stephen R. Callegari; James D. Moncus, and Roland George Harper, Jr., all of Lafayette, La., assignors to Lamb Industries, Inc., Lafayette, La.

Filed Nov. 14, 1974, Ser. No. 523,677
Int. Cl.² E21B *19/14*
U.S. Cl. 214—2.5 **9 Claims**



1. Derrick mounted apparatus for the manipulation of links of pipe comprising in combination at least one finger board for holding links of pipe, and a pipe manipulating apparatus located in proximity to said finger board and comprising:

a pipe manipulating arm having a first end fixed within said derrick and a second end adapted to extend and retract along a pre-determined line;

an extensible arm rotatably mounted on the second end of said pipe manipulating arm;

a pipe gripping hand comprising pipe engaging jaws rotatably attached to the extensible arm, said pipe gripping hand being rotatable in a substantially horizontal plane and said extensible arm being adapted for extending and retracting said pipe gripping hand from said second end of said pipe manipulating arm;

means operative to close or open said pipe engaging jaws to accept or discharge a length of pipes;

means operative to rotate said pipe gripping hand relative to said extensible arm; and

means operative to extend and retract said pipe manipulating arm and said extensible arm.

4,077,526

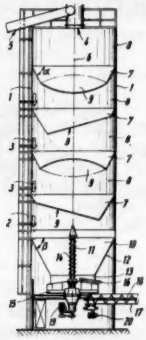
SILO, ESPECIALLY FOR HEAVY FLOWING CHEMICAL AND MINERAL SUBSTANCES

Hans Gessler, Aalen, and Josef Faul, Wasseralfingen, both of Germany, assignors to Schwabische Huttenwerke Gesellschaft mit beschrankter Haftung, Aalen, Germany

Continuation-in-part of Ser. No. 460,611, Apr. 12, 1974, Pat. No. 3,949,888. This application Jan. 29, 1976, Ser. No. 653,445
Claims priority, application Germany, Apr. 12, 1973, 2318560
Int. Cl.² B65G *65/46*
U.S. Cl. 214—17 D **3 Claims**

1. A silo for pourable materials which has an inner wall and an upper portion and a lower portion, especially for heavy-flowing chemical and mineral substances, which includes in combination: a charging station arranged at said upper silo portion for charging pourable materials into said silo, at least one discharge station arranged at the lower silo portion for withdrawing pourable material from said silo, a plurality of friction walls arranged in vertically spaced superimposed position and mounted on said inner wall, each of said friction walls extending all the way around said inner wall while being provided with passage means therethrough for pourable materials to flow from said charging station to said discharge station, said friction walls being inclined in the direction toward said lower silo portion at an angle of inclination relative to horizontal planes which is greater than the specific pouring angle of the pourable materials to be passed through said silo, a discharge funnel arranged in said lower silo portion and having inclined walls the angle of inclination of which relative to the

horizontal plane exceeding the specific bulk weight angle of the pourable material to be passed through said silo, said funnel being provided with an upper inlet opening and a lower outlet opening, vertical withdrawing means extending through said inlet opening into said funnel, variable speed motor means drivingly connected to said withdrawing means, said with-



drawing means extending up to the region of said inlet opening of said funnel, said withdrawing means being surrounded with considerable play by said outlet opening of said funnel so that the effective cross sectional surface of said withdrawing means at the level of said outlet opening is less than one fifth of the cross section of said outlet opening.

4,077,527

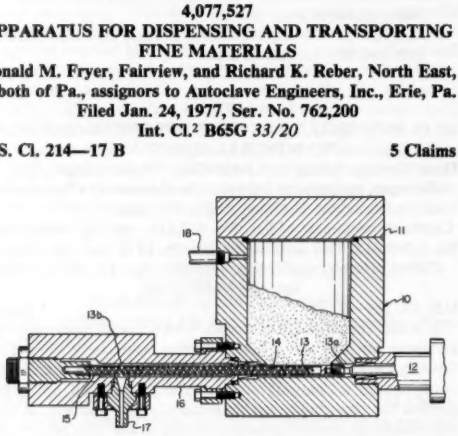
APPARATUS FOR DISPENSING AND TRANSPORTING FINE MATERIALS

Donald M. Fryer, Fairview, and Richard K. Reber, North East, both of Pa., assignors to Autoclave Engineers, Inc., Erie, Pa.

Filed Jan. 24, 1977, Ser. No. 762,200

Int. Cl.² B65G *33/20*

U.S. Cl. 214—17 B **5 Claims**



1. An apparatus for transporting and dispensing fine materials comprising:

a cylindrical conduit arranged to be rotated about its axis,

an inlet at or near one end of the conduit,

an outlet at or near the other end of the conduit,

a helical coil arranged within the conduit coaxial therewith, said helical coil fixed against rotation, and

means for driving the feed tube about its axis to impart rotation to the fine material in the tube thus moving the fine materials through the tube.

4,077,528

TREATMENT PLANT

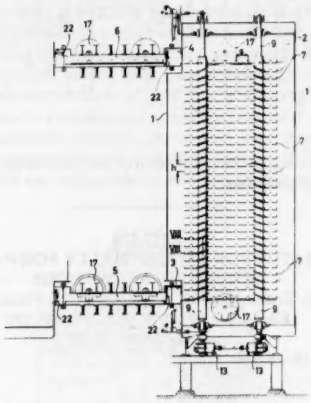
Salomon Santen, Amsterdam, Netherlands, assignor to Stork Amsterdam B.V., Amstelveen, Netherlands

Filed Aug. 11, 1976, Ser. No. 713,500

Claims priority, application Netherlands, Aug. 15, 1975, 7509786

Int. Cl.² A23L *3/06*

U.S. Cl. 214—18 R **6 Claims**



1. An apparatus for physical and/or chemical treatment of products in a treatment space, said products being supported on carriers which are conveyed through the treatment space in a vertical direction, the products being introduced through at least one passage opening into the space and discharged from this space through another opening, the plant comprising driven conveying members within the treatment space for the vertical movement of the carriers, wherein these conveying members are vertically positioned screw spindles (or screwth-reaided rods), each of which is capable to cooperate with a part of all carriers within the treatment space

a housing for said space which is at least in its upper and lower part provided with a passage opening with rails for guiding the carriers, which have two parallel rows of supporting rollers, each screw spindle always cooperating with one of the supporting rollers of each carrier during its vertical movement (transport),

each carrier having a bottom constituted by a plurality of parallel rods, the rods being freely rotatable in the respective carrier and at least one of them being coupled to a supporting roller which cooperates with a screw spindle.

4,077,529

EXCAVATOR BUCKET AND RIPPER TOOTH ASSEMBLY

Pierre Jean Leyrat, Trilport, and Daniel Diony Baconet, Stains, both of France, assignors to Societe Anonyme: Poclain, Le-Plessis-Belleville, France

Filed Jul. 8, 1976, Ser. No. 703,320

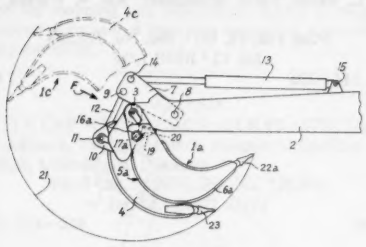
Claims priority, application France, Aug. 1, 1975, 75 24170

Int. Cl.² E02F *3/81*

U.S. Cl. 214—145 R **4 Claims**

1. In a public works machine having a boom, a ripper tooth pivotally mounted on said boom for pivotal movement in a ground ripping direction, and a bucket pivotally mounted on said boom on the same pivot axis of rotation as said ripper tooth and being located in front of said ripper tooth in said ground ripping direction, said bucket having a scoop face facing said ground ripping direction, wherein the improvement comprises means operatively connected between said boom and said ripper tooth for pivoting the ripper tooth in said ripping direction and in a reverse direction from said ripping

direction about its pivotal mounting on the boom, said bucket being freely pivotally mounted on the boom, and means for selectively locking said bucket in a first retracted position on said boom wherein said scoop face of the bucket is adjacent the boom in an inoperative position and a second active position on



said ripper tooth wherein the ripping tooth is directly behind the bucket, whereby only said ripper tooth is pivoted by said pivoting means when said bucket is locked in its first position and both said ripper tooth and bucket is locked in its second position.

4,077,530

METHOD FOR CATALYST CHARGING TO TUBULAR REACTOR

Hiroshi Fukusen; Hironori Yamanaka; Sachio Oishi, and Michito Nakao, all of Niihama, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Jun. 11, 1976, Ser. No. 695,033
Claims priority, application Japan, Jun. 27, 1975, 50-80294
Int. Cl.[2] B65G *69/16*
U.S. Cl. 214—152 **5 Claims**

1. A method for charging catalyst particules to a tubular reactor having at least one vertically arranged catalytic reaction tube of a definite length, which comprises inserting at least one wire of an optional shape into the reaction tube at the upper opening thereof, supplying the catalyst particles to the tube at said upper opening and allowing them to fall along the wire in direct and frequent contact with said wire and/or the inner wall of the reaction tube and gradually withdrawing the wire as the height of the filled catalyst layer increases, thereby slowing down the falling velocity of the catalyst particles and preventing them from being crushed or powdered and, at the same time, obtaining a filled catalyst reaction tube having a uniform bulk density.

4,077,531

APPARATUS FOR HANDLING AND DISPERSING MODULES OF SEED COTTON

Donald W. Van Doorn, and William A. Harmon, both of Columbus, Ga., assignors to Lummus Industries, Inc., Columbus, Ga.

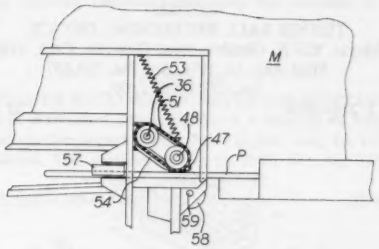
Filed May 26, 1976, Ser. No. 690,285
Int. Cl.[2] B65B *69/00*
U.S. Cl. 214—309 **8 Claims**

1. In apparatus for removing modulized seed cotton and the like from a pallet,

a. a generally horizontal conveyor having a surface capable of supporting seed cotton thereon and having a receiving end,

b. means permitting the pallet to move beneath the conveyor,

c. means associated with the receiving end of the conveyor to lift the modulized cotton from the surface of the pallet and present it to the surface of the conveyor comprising a pivoted cotton lifting section embodying cotton pick-up members having upwardly moving surfaces engageable with the oncoming end of the module, thus to raise the same, and



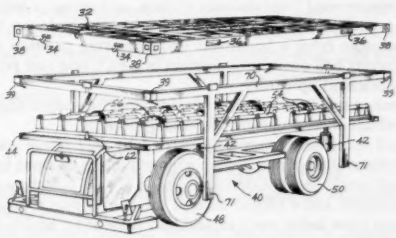
d. stop members effective to limit downward pivoting movement of said cotton lifting section upon engagement with the top of the pallet.

4,077,532

AIRBORNE CARGO CONTAINER TRANSPORTER AND TRANSFER SYSTEM

Darold Ray Bryan, Seattle, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed May 31, 1977, Ser. No. 801,545
Int. Cl.[2] B65G *67/02*
U.S. Cl. 214—310 **13 Claims**



1. Apparatus for handling lightweight cargo containers comprising:

a low profile transporter adapted to receive a cargo container on an upper platform surface thereof, said transporter comprising a frame, a pair of steerable load supporting wheels positioned at the forward end of said frame and a pair of load supporting wheels positioned at the rearward end of said frame, said frame carrying a vertically movable support surface adapted to engage said cargo container, said vertically movable support surface including a side directed roller and drive wheel mechanism for sideways loading and unloading of said cargo container;

a cargo container stand having legs depending from a frame, said frame adapted to rest on said vertically movable support surface and having transporter engaging indexing means to prevent movement of said stand with respect to said transporter when said stand rests upon said support surface;

a cargo pallet adapted to receive said cargo container on the upper surface thereof and having apertures therethrough to receive said roller and drive wheel mechanism, said apertures permitting said roller and drive wheel mechanism to protrude through said pallet into engagement with said cargo container when said pallet and said stand rest upon said transporter, said pallet providing subjacent support to said container to prevent damage thereto during handling; and,

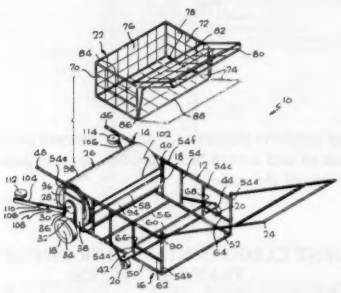
means to latch said pallet to said container to prevent relative motion between said pallet and said container.

4,077,533

TENNIS BALL RETRIEVING DEVICE

John Meyer, 825 N. Glendale Ave., Glendale, Calif. 91206

Filed Aug. 16, 1976, Ser. No. 714,637
Int. Cl.[2] B60P *1/00*
U.S. Cl. 214—356 22 Claims



1. A tennis ball retrieving and dispensing device particularly for use on planar ground surfaces comprising, in combination:

a vehicle including an elongated support frame having a front and rear portion, a top and bottom extending axially between said front and rear portion, and means at said rear portion to impart motion to said vehicle, said device being turnable from a horizontal ball retrieving position to an upright ball dispensing position in which said rear portion is oriented upwardly;

means at said front portion of said frame for supporting said vehicle in said upright dispensing position;

a ball receptacle removably carried by said frame on said bottom thereof and having a hinged upper lid open in said ball retrieving position and closed in said ball dispensing position, and a hinged door at the rear of said receptacle, said door being open in said ball dispensing position and closed in said ball retrieving position, said lid when open and closed in said ball retrieving position, said lid when open being adapted to permit entry of balls conveyed towards said receptacle;

means for adjustably varying the effective receptacle area on said frame;

an arcuate ball guide member secured to said frame forwardly of said receptacle directly adjacent said receptacle at the front thereof, said guide member extending circumferentially from an upper point at a level coinciding closely with the top of said receptacle to a lower point in close proximity with the ground surface, forwardly relative to the bottom of said receptacle, said lower point being spaced from the ground surface a distance less than the diameter of a standard tennis ball;

a rotary drum journalled in said frame for rotation during movement of said vehicle for retrieving balls, said drum being disposed forwardly of said guide member in spaced relation therewith and extending circumferentially from a point substantially higher than said upper point of said guide member and said level of said receptacle top to a point approximating said lower point of said guide member, the sense of rotation of said drum being such as to engage a ball on said surface and to frictionally raise said ball through the spacing defined between said guide member and drum to said receptacle top, at which point the elevated ball is forcibly ejected from said spacing, gravity causing the ball to descend rearwardly into said receptacle; and

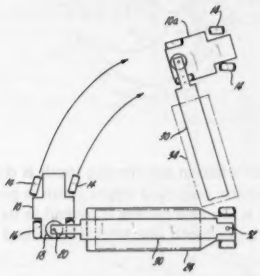
motion transmitting means between said drum and said roller means adjacent said front portion of said frame for imparting synchronous rotational movement from said latter means to said drum.

4,077,534

SELF LOAD/UNLOAD TRAILER

George L. Baaso, 31418 Schoenherr, Apt. 4, Warren, Mich. 48093

Filed Feb. 28, 1977, Ser. No. 772,386
Int. Cl.[2] B60P *1/54*
U.S. Cl. 214—396 7 Claims



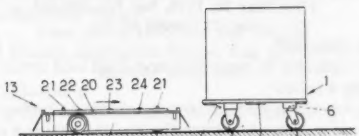
1. Improved trailer means for transporting a multi-ton freight container: said trailer means comprising an inverted U-shaped bridge and a subjacent bed means; said bed means being dimensioned to support a freight container during transit periods, and said bridge being constructed to transfer the freight container to or from the bed means and ground level during loading or unloading periods; roadwheel means carried by said bed means near its rear end; kingpin means mounted at the front end of the U-shaped bridge for engagement with a fifth wheel on a cooperating tractor; turntable connector means joining the bridge to the bed means near its rear end; and hoist means carried by the U-shaped bridge for temporarily suspending the freight container while the tractor is swinging the bridge around the turntable axis; said turntable connector means being located behind the container-accommodation zone defined by the bridge, whereby the container is located outboard from the bed means when the bridge is swung normal to the bed means.

4,077,535

ASSEMBLY FOR THE AUTOMATIC OPERATION OF HAND CARTS, ESPECIALLY HOSPITAL CARTS

André C. Oriol, Paris, France, assignor to Saxby, Paris, France

Filed May 21, 1976, Ser. No. 688,584
Claims priority, application France, May 29, 1975, 75 16797
Int. Cl.[2] B60D *1/04;* B60P *1/10*
U.S. Cl. 214—515 6 Claims



1. An assembly for providing automatic operation of hand carts including hospital carts, comprising:

at least one electric powered and electronically controlled automotive device capable of sliding under the base of said hand cart;

platform means on said device for raising said hand cart above the floor;

means for aligning said hand cart on said platform means;

at least one magnet on the underside of said base; and

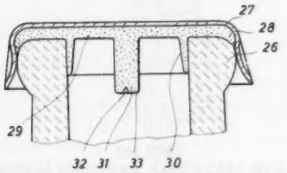
two longitudinally spaced magnetic detectors on said automotive device for slowing said automotive device in response to activation by said at least one magnet of a first one of said detectors as said device slides under said cart and for stopping said automotive device in response to activation by said at least one magnet of a second one of said detectors.

4,077,536

BOTTLE CAP WITH REMOVABLE PLASTIC INSERT

Kai Brandtberg, Valby, Denmark, assignor to Bradfoss Anpartsselskab, Copenhagen, Denmark

Filed Oct. 7, 1976, Ser. No. 730,673
Int. Cl.² B65D *41/12*
U.S. Cl. 215—228 **21 Claims**



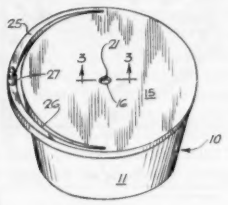
1. A bottle cap comprising a dished metallic cap having means for receiving the mouth of a bottle and including a seal comprising a plastic insert having a base removably received and captured in said metallic cap with one side in substantial abutment therewith; a projection extending from the other side of the base; and means on said projection for receiving a fastener whereby said insert may be removed from said metallic cap and fastened by said projection to another object.

4,077,537

ONE PIECE DISPENSING CLOSURE

Sidney M. Libit, 441 Lakeside Ter., Glencoe, Ill. 60022

Filed May 24, 1976, Ser. No. 688,989
Int. Cl.² B65D *41/50*
U.S. Cl. 215—253 **5 Claims**



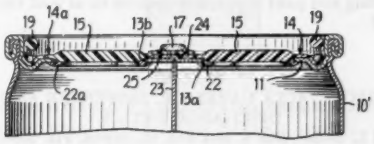
1. A one-piece dispensing closure having body means for securement to means defining a pouring opening through which the contents of a receptacle may be dispensed, said opening adapted to be opened and closed by means of said closure to permit flow and to terminate flow respectively, said body means including a circular top, said closure comprising resilient but generally shape retaining plastics composition, a cylindrical recess in said top, said recess having a floor constituted as a thin puncturable membrane, a flexible bail of substantially semi-circular configuration integrally formed with the body means and connected by its ends thereto, and positioned within the extent of the top, to provide a continuous circular outline for the top, the bail carrying a sharp puncturing member capable of penetrating said membrane upon application of digital force to the member intermediate its ends whereby the bail may be flexed about its ends to position the point of the sharp member confronting the membrane whereupon the member may be thrust through the membrane to present a pouring opening therethrough when the member is withdrawn.

4,077,538

VENDABLE RECLOSABLE BEVERAGE CONTAINER

Nelson J. Waterbury, Marschall Str 9, 8 Munich 40, Germany

Continuation-in-part of Ser. No. 714,484, Aug. 16, 1976, abandoned. This application Sep. 16, 1976, Ser. No. 723,708
Int. Cl.² B65D *41/32*
U.S. Cl. 220—268 **32 Claims**



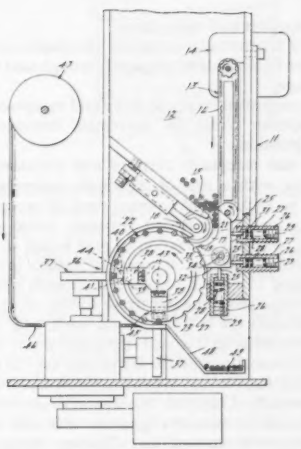
1. A container comprising means including a chime and lid forming the upper end of a substantially rigid container, the lid being recessed below the upper end of the container, at least one opening in the lid for discharge of the contents of the container, a cap extending from the chime to the center of of the lid for closing the opening, the outer portion of the cap engaging the chime, means on the cap and chime to hold the cap in its sealing position on the lid, means pivoting the cap at a pivot point at the center of the lid, sealing means on the lid around the opening and on the cap to form an airtight seal, and finger engageable means on the cap for pivoting it on the lid for unsealing the opening.

4,077,539

WIRE ADVANCING MECHANISM

Malcolm E. Buffaloe, Addison, Ill., assignor to Microdot Inc., Greenwich, Conn.

Continuation of Ser. No. 587,120, Jun. 16, 1975, abandoned. This application Jul. 28, 1976, Ser. No. 709,383
Int. Cl.² B65H *3/06, 5/06*
U.S. Cl. 221—237 **3 Claims**



1. A mechanism for advancing wires from a hopper to a terminal application station of a terminal crimping machine

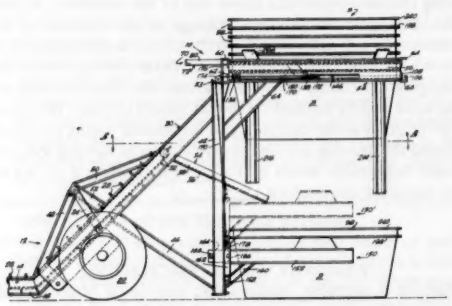
including a hopper for holding a plurality of wires, a continuous resilient belt forming a substantially vertical portion of one wall of the hopper, means for driving said belt with the inwardly disposed substantially vertical face thereof moving downwardly toward a bottom opening in said hopper through which wires from within the hopper are advanced by the action of the downward movement of said belt, a feed wheel cooperating with said belt for advancing the wires in said opening, a floating escapement pawl having an arcuate portion spaced from the periphery of said feed wheel so as to form a variable channel in communication with said hopper and through which said wires are advanced to said feed drum, and means for resiliently supporting said pawl in a manner to permit it to move in any direction parallel to its plane to vary the width of the channel, said resilient supporting means comprising spring pressed pins disposed in contact with said pawl for supporting said pawl in operable position on at least two sides thereof.

4,077,540

RECEPTACLE CARRIAGE, DISPENSER AND DISCHARGE DEVICE

Donald L. Butler, Rte. 4, Box 424, Ft. Myers, Fla. 33905

Filed Sep. 13, 1976, Ser. No. 722,405
Int. Cl.[2] B65G *59/10*; B65B *5/10*
U.S. Cl. 221—297 **8 Claims**



1. A receptacle carriage, dispenser and discharge device comprising,

a main frame including vertical support means and an upper, generally rectangular, horizontally extending support frame,

means to support said main frame,

a generally horizontally extending receptacle carriage and dispenser frame slidably engaged through said upper support frame,

manually controlled means to drive said receptacle carriage and dispenser frame for movement between first and second positions,

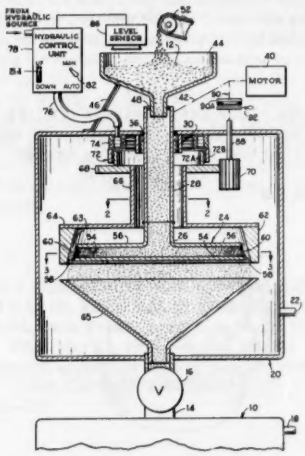
means in said receptacle carriage and dispenser frame to cooperate with a pair of outwardly extending top rim flanges on each one of a nested stack of receptacles, disposed on said carriage and dispenser frame in said first position, whereby operation of said means to drive will sequentially cause the lowermost receptable in the stack to be released to drop downwardly on each movement of said carriage and dispenser frame to said second position, while holding the balance of said stack, and, on each of said movements back to said first position will position the next lowermost receptacle for release on the subsequent movement back to said second position, a rearward opening, generally C-shaped, horizontally extending frame, beneath and in vertical alignment with said stack when said receptacle carriage and dispenser frame is in said second position, said manually controlled means to drive comprising a hydraulic cylinder, piston and piston rod assembly, operably, pivotally connected between each forward end of said extending support frame and one side of said receptacle carriage and dispenser frame to provide the movement of said carriage and dispenser frame between said first and second positions, drive means interconnected between said C-shaped frame and receptacle carriage and dispenser frame whereby said C-shaped frame is simultaneously moved to said raised position when said carriage and dispenser frame is driven from said first to second position, and moved to said lowered position when said carriage and dispenser frame is driven from said second to first position, and wherein said interconnected drive means comprises a cable, fixed at a first end to a distal end portion of each of said piston rods and extending forwardly around a pulley carried by one side of said extending support frame and then downwardly to a point of attachment to said slide means.

4,077,541

PARTICULATE MATERIAL FEEDING METHOD AND APPARATUS

Robert G. Murray, Palo Alto, Calif., assignor to Stanford Research Institute, Menlo Park, Calif.

Filed Jun. 4, 1976, Ser. No. 692,842
Int. Cl.[2] B67B *7/00*; G01F *11/20*
U.S. Cl. 222—1 **27 Claims**



1. A method for continuous feeding of particulate material to a container against a gas pressure differential, comprising,

supplying particulate material from a supply source to a rotor within the container through which rotor the material flows,

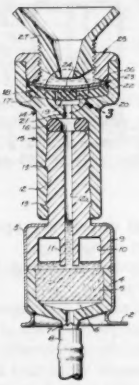
providing a controlled volume restricted flow passage at the outer periphery of the rotor to restrict the rate of flow of the particulate material from the rotor for compaction of said material within the rotor, and

during operation controlling the restricted flow passage independently of the gas pressure differential and rate of rotation of said rotor for control of the rate of flow of particulate material from the rotor.

4,077,542
UNATTENDED AEROSOL DISPENSER

Tor H. Petterson, 6768-8 Los Verdes Dr., Rancho Palos Verdes, Calif. 90274

Continuation-in-part of Ser. No. 528,855, Dec. 2, 1974, abandoned, Ser. No. 528,857, Dec. 2, 1974, abandoned, and Ser. No. 528,858, Dec. 2, 1974, abandoned. This application Nov. 13, 1975, Ser. No. 631,688
Int. Cl.[2] B67D *5/08*
U.S. Cl. 222—70 43 Claims



1. A dispenser for effecting intermittent discharge of an aerosol including product and propellent from an aerosol container, said dispenser means comprising:

a. means defining an accumulator region disposed at one end of the container and having an entrance end communicating with the interior of the container to receive an aerosol therefrom;

b. a snap action means including a diaphram forming a wall of the accumulator region and having a valve seat element, an opposing wall of the accumulator region having a mating valve seat element, said valve seat elements being in fluid sealing relationship when the snap action valve means is closed;

c. means forming a discharge passage from the accumulator region including an entrance end surrounded by one of the valve seats;

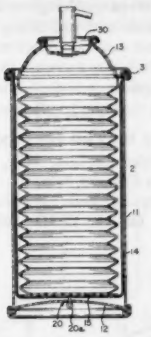
d. and a flow control body fixed between the entrance end of the accumulator region and the interior of the container, said flow control body including an elongated tortuous or labyrinth path means to produce a gradual pressure drop as the product and propellent pass therethrough from the interior of the container into the accumulator region, to volatilize at least a portion of the aerosol to form a gaseous and a liquid phase, which phases pass into the accumulator region for distribution in the accumulator region during gradual rise in pressure therein until the valve seats open for flow through the discharge passage.

4,077,543
PROPELLANTLESS AEROSOL CONTAINER

Donald F. Kulikowski, Oak Forest, Ill.; Kenneth E. Richie, Maple Grove, Minn., and Peter N. Y. Pan, Country Club Hills, Ill., assignors to Continental Can Company, Inc., New York, N.Y.

Filed Feb. 18, 1977, Ser. No. 770,248
Int. Cl.[2] B65D *35/28*
U.S. Cl. 222—95 5 Claims

1. A propellantless product dispensing container prepared for filling, comprising a rigid container body including a sidewall, a base, and upper portion, a flexible container member carried within said body for receiving and holding said product, and elastomeric means for forcing said flexible container member to contract in volume to dispense said product therefrom, said elastomeric forcing means being releasably tensioned between said body base and said upper portion from

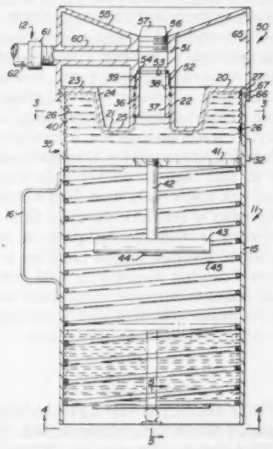


without said container body and being releasable to impress a dispensing force on said flexible container member.

4,077,544
FLUID TRANSFER DEVICE

Joseph J. Malacheski, and Richard J. Zenda, both of Wilkes-Barre, Pa., assignors to Donald Gutkowski, Ashley, Pa., a part interest

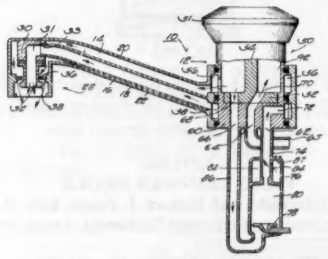
Filed Aug. 16, 1976, Ser. No. 714,798
Int. Cl.[2] B67D *5/06*
U.S. Cl. 222—95 10 Claims



1. A fluid transfer device comprising an elongate casing, one end wall at one end of said casing, the other end of said casing being sufficiently open to receive a user's hand and configured to define a ground engageable plane for stably supporting said casing in upright relation, a fluid port in said one end wall, an expansile and collapsile container having a fluid port and located within said casing and having its fluid port secured in communication with the casing fluid port, said container being expansile away from said one end wall to receive fluid through said ports and collapsile toward said one wall to expel fluid through said ports, a plunger shiftable in said casing between extreme positions toward and away from said one end wall to enable expansion and effect collapse of said container, resilient means urging said plunger toward said one wall, said plunger and resilient means being entirely within said casing in said extreme positions, outwardly flaring filling means connected in

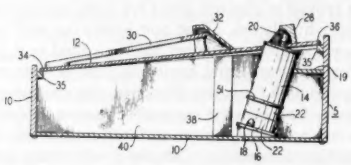
fluid communication with said ports and facing upwardly when said casing is supported in its upward relation for collecting and guiding fluid to said container, closure means for said filling means, and valved discharge means connected to said ports between the latter and said filling means for selectively discharging fluid from said container under the force of said resilient means.

4,077,545
INSTANT HOT WATER DISPENSING SYSTEM
Robert F. Karls, Hales Corners, Wis., assignor to Emerson Electric Co., Hales Corners, Wis.
Filed Sep. 22, 1976, Ser. No. 725,591
Int. Cl.² B67D 5/62
U.S. Cl. 222—144.5 **16 Claims**



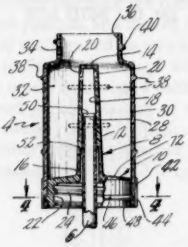
1. An instant hot water dispenser system comprising a dispensing spout having a dispensing outlet, an instant hot water passage and a plumbing system cold water passage, said passages communicating with said dispensing outlet, valve means controlling said passages and having a first valve position and a second valve position to provide a mix of cold water and instant hot water, an instant hot water tank, means for coupling said valve means to said instant hot water tank, said valve means including a chamber, said chamber being in communication with said cold water passage and in communication with a source of plumbing system water, conduit means connecting said chamber to said tank to deliver cold water from said chamber to said hot water tank, fluid flow restrictor means in said dispensing outlet to restrict cold water flow therethrough and when said valve is in said second position, said restriction means causes water pressure in said chamber to cause water flow through said conduit means after cold water exits from said dispensing outlet to displace water from said instant hot water tank to be mixed with said cold water exiting said dispensing outlet to provide a warm water mix.

4,077,546
FOOT HEALTH AID APPLIANCE
Irwin Winkelried, 1 Beech Ter., Millburn, N.J. 07041
Filed Oct. 8, 1976, Ser. No. 730,802
Int. Cl.² B67D 5/06
U.S. Cl. 222—179 **9 Claims**



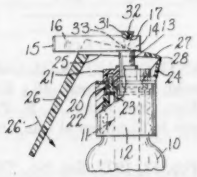
7. The foot medication application system of claim 6 wherein the medicated spray released from the spray container is a medicated aerosol powder.

4,077,547
MEASURING AND DISPENSING APPARATUS
Robert J. Donoghue, 4 Burnwood Dr., Bloomfield, Conn. 06002
Filed Feb. 2, 1976, Ser. No. 654,657
Int. Cl.² B65D 37/00
U.S. Cl. 222—207 **7 Claims**



1. A measuring and dispensing apparatus for use with a flexible-wall container, comprising:
- dispensing means having an enlarged base portion and an upstanding portion;
- wall means disposed around said dispensing means, said wall means and enlarged base portion of said dispensing means forming a fluid measuring chamber positioned above the flexible-wall container when said dispensing means is in operable engagement with said flexible-wall container, said chamber having an upper end having a fluid outlet;
- said upstanding portion having an upper end above said base portion of said dispensing means and within the walls of said fluid measuring chamber and a lower end, said lower end disposed on said enlarged base portion, said upstanding portion also having a bore therein and an outlet orifice disposed therein proximate said upper end at an angle offset from the axis of said bore and in fluid communication with said bore;
- said enlarged base portion having a container engaging means thereon; and
- tube means having an inlet end and an outlet end, said tube means disposed such that said outlet end is disposed in the bore in said upstanding portion of said dispensing means and in fluid communication therewith, said inlet end adapted to be disposed in the flexible-wall container.

4,077,548
TRIGGER ACTUATOR FOR DISPENSING PUMPS WITH SADDLE PULL-DOWN
Walter C. Beard, South St., Middlebury, Conn. 06762
Filed Dec. 27, 1976, Ser. No. 753,992
Int. Cl.² B65D 83/00
U.S. Cl. 222—321 **6 Claims**



1. In combination with a pump for dispensing liquid from a container, the pump being adapted for actuation by vertical depression of a push button on the plunger and having a spray nozzle associated with the push button for directing laterally the dispensed liquid, pump actuating means comprising an annular base adapted for securement on the top of a container

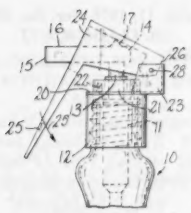
closure member, a trigger mounting post projecting upwardly from the base, an elongated trigger having one end hinged to the top of the post, an intermediate portion bifurcated to pass either side of the push button and nozzle and the other end extending downward below the nozzle to constitute a finger piece, and a saddle having a bridge portion resting on the push button and side portions each connecting one end of the saddle to one side of the bifurcated trigger portion by at least one flexible connection point, permitting said side portions to rock relatively to the trigger in the vertical plane of movement of the trigger, whereby depression of the trigger pulls the push button downward.

4,077,549

TRIGGER ACTUATOR FOR DISPENSING PUMPS

Walter C. Beard, South St., Middlebury, Conn. 06762

Filed Dec. 27, 1976, Ser. No. 753,995
Int. Cl.² B65D *83/00*
U.S. Cl. 222—321 **4 Claims**



1. In combination with a pump for dispensing liquid from a container, the pump being adapted for actuation by vertical depression of a push button on the plunger, and having a nozzle spaced from the axis of the plunger at the end of an elongated lateral extension of the push button for directing laterally the dispensed liquid, the pump further being provided with a collar element adapted to bear against the top surface of a container cap, pump actuating means comprising

an annular base adapted to be held in place between said collar element and said top surface for securement of said means on the top of the container closure member,

trigger support means projecting upward from the base

and a trigger pivotally connected to the support means,

the trigger having a body portion provided with a chamber adapted to contain a portion of the push button extension,

said chamber having a lateral opening through which the nozzle end of the extension can project,

and a finger piece projecting downwardly below the nozzle,

the trigger body portion and push button extension being provided with cooperating parts adapted for sliding engagement to depress the plunger when the finger piece is pulled to rotate the trigger about its pivotal connection.

4,077,550

INTERLOCK WITH INSIDE OF CYLINDER

Dick T. van Manen, Canandaigua, N.Y., assignor to Voplex Corporation, Pittsford, N.Y.

Filed Jun. 21, 1976, Ser. No. 697,866
Int. Cl.² G01F *11/04*
U.S. Cl. 222—327 **11 Claims**

1. An interlock between a cylinder having a wall formed of a resiliently deformable material and a member fitting into the inside of an end region of said cylinder adjacent an end of said cylinder, said interlock comprising:

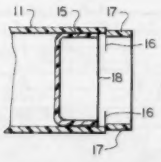
a. said wall of said cylinder in said end region having a plurality of discrete through cuts evenly spaced from said end of said cylinder;

b. said through cuts being positioned to form catches from the segments of said wall between each of said cuts and said end of said cylinder;

c. each of said catches having a length circumferentially of said wall longer than the width of said catches from said cuts to said end of said cylinder;

d. said member having a body having an interference fit with the inside of said cylinder and slidable from said end of said cylinder inward past said cuts and said catches;

e. said interference fit between said body and said cylinder being sufficient for radially expanding said wall slightly in a region axially inwardly of said cuts and said catches and



thereby drawing and holding said catches radially inward from the locus of said cylindrical wall toward a chord orientation relative to said cylindrical locus; and

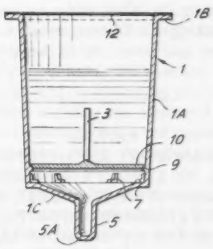
f. said body of said member being seated inside said cylinder axially inward of said cuts so said radially inwardly drawn catches are disposed between said body and said end of said cylinder to interlock with said body and prevent movement of said body toward said end of said cylinder.

4,077,551

CONTAINER WITH BOTTOM SEALING DISK WHICH BECOMES A DEFORMABLE MEMBER ON DISCHARGE

Adriana Manaresi, Via delle Porte Nuove 12, Florence, Italy

Filed Feb. 13, 1976, Ser. No. 658,048
Int. Cl.² B65D *25/40*
U.S. Cl. 222—494 **4 Claims**



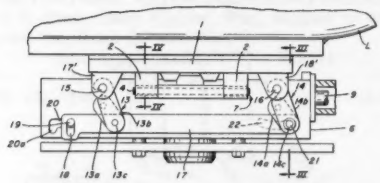
1. A capsule confection for concentrated products to deliver them under the effect of a pressurized fluid which is introduced into the capsule confection for selectable forming and delivery of a beverage from said confection, said capsule comprising: a glass-shaped body with a tapered bottom, a terminal central hollow extension capable of being cut off, a conical side wall, a continuous supporting edge inside of said wall, and supporting extensions below said edge; a closure pierceable baffle for introducing the diluent; a relatively flexible seal disc which is introduced into the glass-shaped body to rest along said continuous supporting edge ensuring the seal with a slight forcing between the disc periphery and the lateral wall of the capsule; said inner extensions below said supporting edge being adapted to contact said sealing disc when the latter is urged by an internal pressure beyond said supporting edge, in such a manner that said disc by effect of the internal pressure is deformed along the periphery allowing the outflow of the liquid from the interior of the glass-shaped body through the hollow cut-off extension forming a delivery opening.

4,077,552

SLIDING GATE SPRING LOADING TOGGLE

Joseph Lothmann, Langerwehe, Germany, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Jan. 27, 1977, Ser. No. 763,186
Claims priority, application Germany, Jan. 21, 1976, 2602087
Int. Cl.² B22D *37/00, 41/08*
U.S. Cl. 222—600 **7 Claims**



1. A sliding gate valve for a teeming ladle including a housing hingedly attached to the bottom of said ladle and vertically movable with respect thereto, a slide frame in said housing, means for imparting motion to said slide frame in said housing a slide plate mounted in said slide frame and urgeable against a superposed top plate by springs carried by said slide frame, and compression means on both sides of said housing parallel to the direction of movement of said slide frame operative to move said housing toward the bottom of said ladle by loading said springs, characterized in that said compression means comprises:

a. levers pivotable in the direction of movement of said slide frame through movement of said slide frame in one direction into a condition loading said springs and into a condition unloading said springs by movement of said slide frame in the other direction;

b. follower means selectively positionable between said slide frame and said levers for transmitting the motion-imparting force from said slide frame to said levers alternately in one direction or the other; and

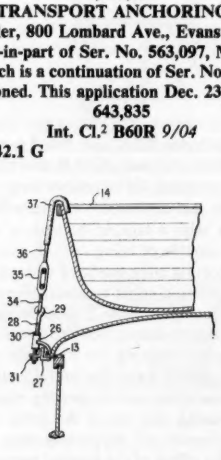
c. means for locking said follower means with respect to said housing when said levers are in the springloading condition.

4,077,553

BOAT TRANSPORT ANCHORING DEVICE

Thomas J. Miller, 800 Lombard Ave., Evansville, Ind. 47715

Continuation-in-part of Ser. No. 563,097, Mar. 28, 1975, abandoned, which is a continuation of Ser. No. 365,709, May 31, 1973, abandoned. This application Dec. 23, 1975, Ser. No. 643,835
Int. Cl.² B60R *9/04*
U.S. Cl. 224—42.1 G **9 Claims**



1. For use with a car top having a pair of rain gutters, each consisting of a side wall and a bottom wall along the respective sides of the car top, at least a pair of boat transport anchoring devices for anchoring a boat upright on a car top, each anchoring device comprising

a. first means for locking engagement with the rain gutters of the car top,

b. second means for engaging the gunwale of the boat,

c. turnbuckle means connected between said first and second means for maintaining the boat firmly and directly against the car top for over the highway transport, and

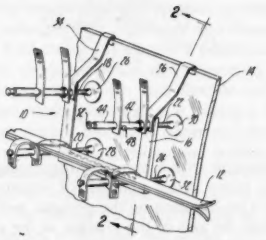
d. said first means comprising a two-jaw clamp adapted to be adjustably secured to opposite sides of the bottom wall of the rain gutter to apply equal pressure thereto and further comprising means connectible at one of its ends to one end of the turnbuckle, said other end of said connectible means being adjustably connected axially to the jaw applying pressure against the outside bottom wall of the rain gutter.

4,077,554

WINDOW MOUNT SKI RACK

David P. Goode, 2015 Long Lake Shores, Orchard Lake, Mich. 48033

Filed Jun. 11, 1976, Ser. No. 695,314
Int. Cl.² B60R *9/12*
U.S. Cl. 224—42.46 R **8 Claims**



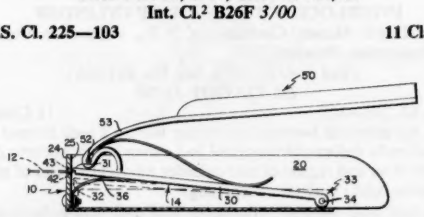
1. A ski rack adapted to be mounted on any substantially vertical window panel of an automotive vehicle comprising: a frame; at least one pair of spaced parallel elongate members carried by and extending through said frame, said elongate member ends extending from one side of the frame to form a rest for skis; said pair of elongate member ends extending from said other side of said frame each having mounted thereon a suction cup for securement to the window panel; and at least one hanger of flat stock extending from the frame transversely to said elongate members and having a hooked free end for disposition over the top edge of the window whereby said portion of said pair of elongate members are disposed in a substantially horizontal direction.

4,077,555

BLADE-BREAKING APPARATUS

Adolph L. Jeff, 155 Park La., Rochester, N.Y. 14625

Filed Feb. 15, 1977, Ser. No. 768,727
Int. Cl.² B26F *3/00*
U.S. Cl. 225—103 **11 Claims**



1. A hand tool for breaking the blade portion of a frangible blade along a substantially rectilinear line extending transverse to the cutting edge, such blade having a pair of opposing planar surfaces, said tool comprising:

a. a frame including means defining a substantially rectilinear

breaking edge which is adapted to engage one of the planar surfaces of the blade along a desired breaking line;

b. a blade-breaking member pivotally mounted relative to said frame for movement by hand from an inoperative position toward a blade-breaking position, said member having a surface which, during movement of said member toward said blade-breaking position, is positioned to engage the blade and exert a force on the opposite planar surface thereof at a position spaced from a rectilinear line directly opposite said desired breaking line; and

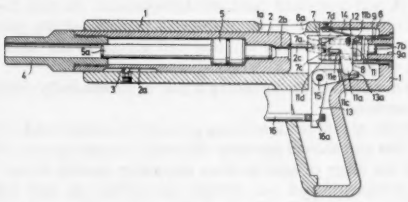
c. means mounted on said frame for exerting a counterforce on said blade to maintain the position of said blade substantially fixed relative to said frame during movement of said breaking member toward said blade-breaking position.

4,077,556

LATCHING ARRANGEMENT FOR THE FIRING PIN IN AN EXPLOSIVE POWDER CHARGE DRIVEN SETTING GUN

Franz Büchel, Rugell, Liechtenstein, assignor to Hilti Aktiengesellschaft, Schaan, Liechtenstein

Filed Feb. 15, 1977, Ser. No. 768,750
Claims priority, application Germany, Feb. 24, 1976, 2607436
Int. Cl.² B25C *1/14*
U.S. Cl. 227—8 **10 Claims**



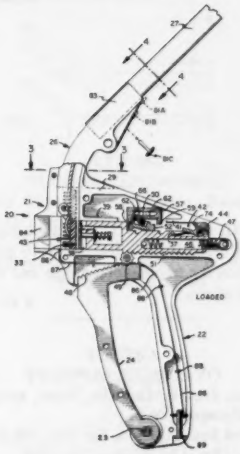
1. Explosive powder charge driven fastening element setting gun comprising a housing having a forward end and a rearward end, a barrel mounted within said housing and extending from the forward end toward the rearward end thereof, said barrel having an axially extending bore therein with said barrel being displaceable within said housing in the axial direction of the bore, an axially extending firing pin displaceably mounted in said housing and aligned rearwardly of said barrel, said firing pin being displaceable between a cocked position and a firing position, a firing spring located in said housing and biasing said firing pin toward the forward end of said housing into the firing position, said firing pin being movable into the cocked position by displacing it in the rearward direction of said housing against the biasing action of said firing spring, a latch displaceably mounted in said housing, a trigger disposed in said housing in contact with said latch for displacing said latch, said latch arranged to rotate said firing pin about the axis thereof for releasing the firing pin from the cocked position, wherein the improvement comprises a lug secured to and extending laterally outwardly from said firing pin, said latch comprising a driving cam engagable with said lug to rotatably displace said firing pin, and a return cam extending transversely of said driving cam and arranged to contact said lug, said driving cam being engageable with said lug only when said firing pin is in the cocked position and said return cam being engageable with said lug in the axial direction of said firing pin for the range of movement of said firing pin from the cocked position into the firing position.

4,077,557

DIP STORAGE, INSERTION AND EJECTION TOOL

LaVerne Merritt Green, 8 Kevin Dr., Danbury, Conn. 06810

Filed Jun. 1, 1976, Ser. No. 691,535
Int. Cl.² H05K *13/04*
U.S. Cl. 227—83 **18 Claims**



1. A portable hand-held storage-dispensing tool for components having arrayed diverging pairs of terminal posts protruding therefrom, comprising:

A. a central housing defines a component delivery chamber having an exit portal opening outward therefrom through a forward portion of the housing,

B. means forming a longitudinal elongated slideway in said housing having a rear blind end and extending forwardly therefrom through the component delivery chamber to the exit portal,

C. means forming an upwardly opening component chute entering the component delivery chamber, through an upper portion thereof,

D. a ram slidingly mounted in the slideway for longitudinal forward and rearward reciprocating movement between a rearmost position abutting the blind end and a forwardmost position juxtaposed to the exit portal,

E. a detent safety latch interferingly engageable with the ram to resist movement of the ram,

F. a squeezable trigger-handgrip extending downward from said central housing and connected to translate squeezing contraction of the trigger-handgrip into sliding forward movement of the ram; and

G. detent-release means connected to override and disengage the detent safety latch from the ram in response to squeezing contraction of the trigger handgrip.

4,077,558

DIFFUSION BONDING OF CRYSTALS

Jeffrey Allen Carlson; Bradford Clyde Schwartz, both of Longmont, and Gerald Steving, Berthoud, all of Colo., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 6, 1976, Ser. No. 748,249
Int. Cl.² B23K *31/02*
U.S. Cl. 228—121 **24 Claims**

1. A method of bonding two crystals together comprising the steps of:

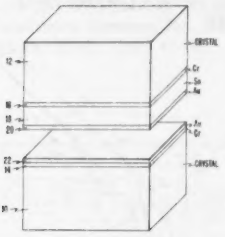
depositing a layer of bond enhancing material on one of said crystals;

depositing a layer of a noble metal on said bond enhancing material;

depositing on said other crystal a low melting point metal selected from the group Sn and In;

depositing a layer of noble metal on said low melting point metal to prevent oxidation thereof; and

bringing together the noble metal layers at a temperature of



between 100° C and 200° C and applying a pressure in excess of 50 pounds per-square-inch to cause a diffusion bond between the noble metal atoms and the low melting point metal atoms.

4,077,559

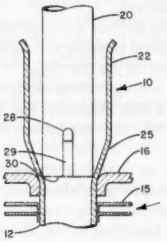
OVAL BELL CONCEPT

James J. Watson, Jr., McMinnville, Tenn., assignor to Carrier Corporation, Syracuse, N.Y.

Filed Sep. 27, 1976, Ser. No. 726,862

Int. Cl.² B23K *1/12, 1/06*

U.S. Cl. 228—154 **4 Claims**



1. The method of joining tubular components including

forming an oval bell in the end of one member having an internal major and minor axis,

forming a pair of diametrically opposed nibs on the outer surface of a second tubular member, bringing the second tubular member into telescoping engagement with the oval bell formed in the first member with the nibs of the second member in interference engagement with the interior wall of the bell along the minor axis thereof, such that a space for solder entry remains between the outer surface of the second tubular member and the inner surface of the oval bell along the major axis thereof, and

bringing molten solder filler material into the joint region and thereafter permitting said filler to solidify.

4,077,560

DENTAL SOLDER

Pei Sung, Lawrenceville, and James Lee-You, Cranbury, both of N.J., assignors to Johnson & Johnson, New Brunswick, N.J.

Division of Ser. No. 546,222, Feb. 3, 1975, abandoned. This application Apr. 12, 1976, Ser. No. 675,654

Int. Cl.² B23K *1/04, 1/12*

U.S. Cl. 228—220 **1 Claim**

1. A method for joining units of a dental restoration comprising:

heating the metal surfaces of the dental restoration structural units to be joined at the point of desired juncture in the reducing zone of a flame;

introducing to the heated metal surfaces, a dental solder formed from an alloy consisting of, on a weight percent basis, from about 65% to 75% nickel, about 14 to 19.9% chromium about 4 to 5.5% silicon, about 2.5 to 6% boron and 0 to about 6% molybdenum;

maintaining the flame until the flow of solder has initiated; and

thereafter, removing the unfused solder and the heat source and allowing to cool to obtain a soldered joint having a tensile strength of at least 70,000 p.s.i.

4,077,561

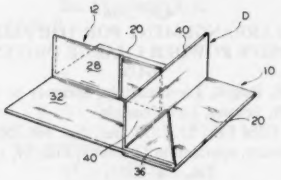
PARTITION ARRANGEMENT

Jeffrey M. Gardner, Wheaton, Ill., assignor to Container Corporation of America, Chicago, Ill.

Filed Jul. 20, 1977, Ser. No. 817,368

Int. Cl.² B65D *5/48, 25/04*

U.S. Cl. 229—42 **2 Claims**



1. A self-contained partition arrangement, formed from a rectangular unitary blank of foldable paperboard, for providing three cells with one cell disposed normal to the other two cells, comprising:

(a) a base member including a pair of substantially coplanar sections;

(b) one of said sections being generally L-shaped and having first and second portions extending normal to each other;

(c) the other of said sections extending parallel to the first portion of said one section and having an end area in lapped relation with a free end area of the second portion of said one section;

(d) a first partition member including a pair of partition panels disposed in face-to-face relation with upper edges foldably joined to each other and with lower edges foldably joined to adjacent inboard edges of said other section and the first portion of said one section, respectively;

(e) a second partition member including a partition element extending normal to said first partition member and a triangular gusset element foldably joined at one edge to a lower edge of said partition element and having another edge foldably joined to an angular edge of said other section.

4,077,562

TIE STRIP

Gene Ballin, Locust Valley, N.Y., assignor to Betty Ballin, Locust Valley, N.Y.

Continuation-in-part of Ser. No. 624,014, Oct. 20, 1975, Pat. No. 3,973,610, which is a continuation-in-part of Ser. No. 434,548, Jan. 18, 1974, Pat. No. 3,913,178. This application Aug. 2, 1976, Ser. No. 711,034

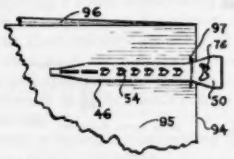
The portion of the term of this patent subsequent to Aug. 10, 1993, has been disclaimed.

Int. Cl.² B65D *33/30*

U.S. Cl. 229—62 **11 Claims**

1. An individual tie strip comprising an elongated pliable resilient strip, said strip being flexible about its longitudinal medial axis and having longitudinally spaced generally similar openings formed therein, at least one flexible resilient tongue

registering with each of said openings and projecting generally longitudinally from an end edge of the respective opening and being integrally formed with said strip, wherein the strip is flexed along its longitudinal axis and one end of the strip is passed through one opening to form a loop, the tongues of the openings along the strip advancing through said one opening



sequentially being bent by the edge of said one opening through which the loop is advancing, and that said one opening resists expansion of the loop by interlocking with the tongue of the cooperating other opening, said strip including a strap portion and a tab head portion integrally mounted at one end and being wider than said strap portion.

4,077,563

COLLECTING DEVICE FOR REFUSE, DUST ETCETERA

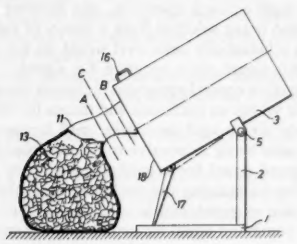
Karl Bo Lennart Lövqvist, Nyvallsvagen 13, 802 39 Gavle, Sweden

Continuation of Ser. No. 461,130, Apr. 15, 1974, which is a continuation of Ser. No. 222,866, Feb. 2, 1972, abandoned. This application Aug. 9, 1976, Ser. No. 712,864

Claims priority, application Sweden, Feb. 17, 1971, 2026/71

Int. Cl.[2] B65D *91/00*

U.S. Cl. 232—43.2 **6 Claims**



1. Apparatus for collecting refuse in a receptacle, comprising:

a stationary support having a horizontal surface for supporting said receptacle,

a substantially tubular casing open at both ends and extending substantially vertically with the lower end of said casing situated in close proximity above said horizontal surface in a refuse collecting position of said casing to prevent access to the interior thereof,

a holder located at the upper end portion of said tubular casing and including a substantially annular wall spaced apart from said casing to define therebetween a substantially annular opening,

a magazine of a hose-shaped plastic sheet packaging material folded together with the folds extending about said annular wall of said holder, said magazine being accommodated in said annular opening, a part of said packaging material being withdrawable from said magazine into said casing to form a receptacle for receiving refuse through the upper opening of said casing, and

means, permanently and pivotally interconnecting said casing and support, for allowing said casing to move in relation to said support so as to enable removal of a filled receptacle through the lower opening of said casing, said means allowing said casing to move to an inclined position in relation to said support to facilitate removal of the filled receptacle and carrying said casing in such a way that upon shifting said casing to an inclined position in relation to said support the lower end of said casing at every point moves in an upward direction.

4,077,564

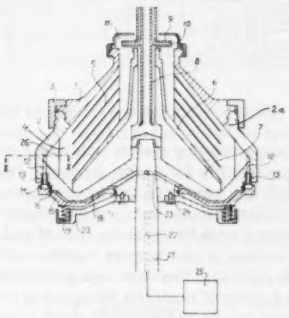
SLUDGE CENTRIFUGE

Henric Wilhelm Thylefors, Stockholm, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Division of Ser. No. 652,754, Jan. 27, 1976, Pat. No. 4,015,773. This application Mar. 14, 1977, Ser. No. 777,472

Int. Cl.[2] B04B *11/04*

U.S. Cl. 233—20 A **6 Claims**

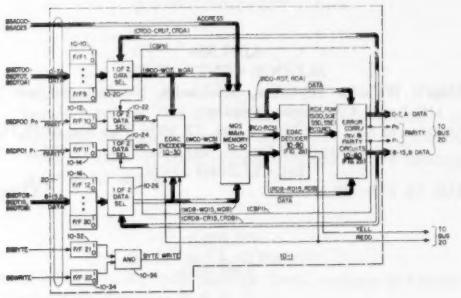


1. A centrifugal separator comprising a rotor mounted for rotation about an axis and having a separating chamber provided with an inlet for a mixture of liquid and solids and with an outlet for separated liquid, the rotor also having at its outer periphery a plurality of separate channels serving as peripheral outlets for sludge separated in said chamber, means located in the separating chamber between said sludge outlets and forming funnel-shaped pockets each converging radially outward toward a corresponding sludge outlet for accumulating separated sludge, means movable axially to and from sealing contact with the rotor around the outer ends of said peripheral channels and adapted to seal the sludge outlets intermittently by an axially directed force against the rotor, means operated by pressurized air for operating said sealing means and including a plate movable axially of the rotor and coacting with the outer surface thereof to form a second chamber which is sealed, said operating means also including mechanical springs distributed around the rotor axis and constantly applying to said plate an axial force in the direction for operating said sealing means to seal the peripheral outlets, said operating means also including a device for supplying pressurized air intermittently to said second chamber to move said plate intermittently against the action of said springs and in the axial direction for operating the sealing means to open the peripheral outlets, the rotor and said sealing and operating means being formed to allow the ejected sludge to leave the rotor without any obstruction, and means for sealing said second chamber including a first seal located between the rotor and the radially inner portion of the plate and a second seal located between the rotor and the radially outer portion of the plate, both of said seals being located radially inward from the peripheral sludge outlets.

4,077,565
ERROR DETECTION AND CORRECTION LOCATOR CIRCUITS

Chester M. Nibby, Jr., Peabody, and George J. Barlow, Tewksbury, both of Mass., assignors to Honeywell Information Systems Inc., Waltham, Mass.

Filed Sep. 29, 1976, Ser. No. 727,820
Int. Cl.² G11C 29/00; G06F 11/12
U.S. Cl. 235—312 21 Claims



1. In a data processing system including a memory subsystem having a memory for storing groups of data signals, each group including a number of data bits and error detection and correction (EDAC) means including an encoder for generating a group of check code bit signals for each of said groups of data signals for storage in said memory together with the group of data signals associated therewith and a syndrome decoder for generating a group of syndrome bit signals in response to each group of data signals and group of check code bits read out from said memory, said group of syndrome signals for detecting correctable and uncorrectable error conditions within said group of data and check code bits signals, said EDAC means further including EDAC correction circuits comprising:

a plurality of decoder circuit means, each having a number of input terminals and a number of output terminals including first and second groups, said number of input terminals of each decoder circuit means being connected to receive a different combination of said group of syndrome signals from said syndrome decoder;

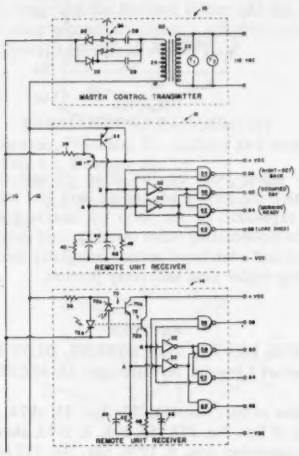
a plurality of data bit correction circuit means connected to receive each said group of data signals read out from said memory, said plurality corresponding to said number of data bits, each of said data bit correction circuit means being connected to a different one of said first group of output terminals of one of said plurality of decoder circuit means and being connected to receive a different one of said number of data bits; and,

said plurality of decoder circuit means being conditioned by said group of syndrome signals to force a predetermined one of said first group of output terminals of one of said plurality of decoder circuit means to a predetermined state for enabling correction of a data bit signal by one of said pluarlity of said correction circuit means when said group of syndrome signals designate the presence of a correctable error condition and said plurality of decoder circuit means being conditioned by said group of syndrome signals to force one of said second group of output terminals of one of said plurality of decoder circuit means to said predetermined state for inhibiting correction of any of said data bit signals by said plurality of correction circuit means when said group of syndrome signals designate the presence of an uncorrectable error condition.

4,077,566
NIGHT SETBACK-MORNING READY CONTROL SYSTEM FOR UNIT VENTILATORS

George J. Bradford, York, Pa., assignor to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Feb. 19, 1976, Ser. No. 659,398
Int. Cl.² F24F 11/00; F23N 5/20
U.S. Cl. 236—46 C 17 Claims



1. A temperature control system, comprising:

a master control transmitter for transmitting selected command signals during predetermined periods of time, said command signals corresponding to occupied day operation, night setback operation, and morning ready operation and being selected from a group of signals comprising, a substantially zero level signal, an a.c. signal, a positive d.c. signal and a negative d.c. signal;

a temperature control apparatus including means for tempering air within an enclosure and means for delivering fresh outside air to said enclosure, said temperature control apparatus being responsive to the occupied day operation command signal for providing fresh air to the enclosure and for maintaining the enclosure at a selected day temperature set point, and being responsive to the night setback command signal for prohibiting the entrance of fresh air into the enclosure and for maintaining the enclosure at a night temperature set point and being responsive to the morning ready command signal for preventing the introduction of fresh air into the room while maintaining the room temperature at the day temperature set point.

4,077,567
PNEUMATIC TEMPERATURE RESET DIFFERENTIAL PRESSURE CONTROLLER

LeRoy Dry Ginn; LeRoyce Sloe Ginn, both of San Leandro, and Dalny Travaglio, Kensington, all of Calif., assignors to Universal Pneumatic Controls, Inc., Oakland, Calif.

Filed Jun. 18, 1976, Ser. No. 697,360
Int. Cl.² F24F 7/06
U.S. Cl. 236—49 21 Claims

1. A control for a variable air flow volume conditioned air distribution system of the kind having an air flow duct for supplying conditioned air to a room, a movable member in the duct for regulating the volume of air flowing through the duct, and an air powered actuator connected to position the movable member, said control comprising,

valve means for varying the pressure of the air supplied to the actuator,

air flow velocity sensing means for sensing the air flow velocity in the duct and connected to the valve means for

applying a flow velocity force to the valve means in response to the sensed air flow velocity,

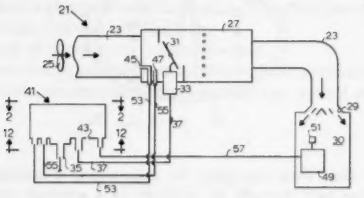
bias spring means connected to the valve means for applying a spring force to the valve means in opposition to the flow velocity force of the air flow velocity sensing means to determine the air flow velocity set point of the controller,

room temperature sensing means for sensing the temperature of the air in the room and connected to the bias spring means for applying a room temperature force to the bias spring means in response to the sensed temperature to change the air flow velocity set point of the control in response to changes in the room air temperature so that the control maintains a constantly regulated amount of air flow into the room in proportion to the room's temperature demands, and

including calibration means for calibrating the air flow velocity set point of the controller.

18. A method of controlling the volume of air flow through a duct in a variable air flow conditioned air distribution system, said method comprising,

regulating the volume of air flow through the duct by an air powered actuator,



supplying air under pressure to the actuator through a supply conduit,

controlling the pressure of the air supplied to the actuator by a valve associated with the supply conduit,

sensing the air flow velocity in the duct and applying a flow velocity force to the valve in one direction in response to the air flow velocity,

applying a bias spring force to the valve in opposition to the flow velocity force to determine the air flow velocity set point,

sensing the temperature of the room supplied with the conditioned air from the duct,

combining a room temperature force with the bias spring force in response to the sensed temperature to change the air flow velocity set point with changes in the room temperature, and

including changing the velocity set point in response to changes in static air pressure in the duct to automatically compensate for control offset caused by changes of static air pressure in the duct.

4,077,568
MOBILE BOILER HOUSE

Richard May, Dadford, England, assignor to Intercity Electric & Mechanical Services Ltd., England

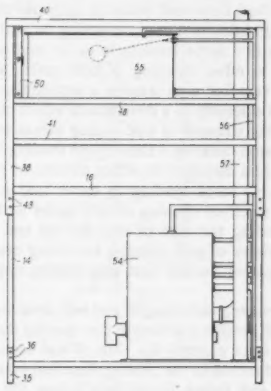
Filed Jun. 10, 1976, Ser. No. 694,649

Claims priority, application United Kingdom, Jun. 18, 1975, 25959/75

Int. Cl.[2] F24D *3/10*; F27B *37/36*

U.S. Cl. 237—8 D **3 Claims**

1. A water boiler and housing therefor comprising a lower housing part and an upper housing part, said lower housing part comprising a floor, corner uprights fixed to the floor, said upper housing part including upright corner angle irons which slide on and are guided by said corner uprights, horizontal side frame members connecting the adjacent corner uprights together at their upper ends, flaps pivoted to the floor, uprights and horizontal frame members adapted to be folded along the sides of the housing and to be opened out to form housing extensions on each side; said boiler being stationary supported by said floor within the lower housing part; said upper housing part including a roof and front, back and side walls adapted to slide telescopically and vertically over the lower housing part when said flaps are folded in, one of said walls having at least a part thereof removable for access, means for fixing the upper housing part to the lower housing part above the floor mounted flaps when said floor mounted flaps are in open extended positions, a horizontal support within the upper housing part adapted to support a water tank, vertically collapsible means connecting said support to the roof of the upper housing part whereby said support is near the roof when the upper housing part is collapsed over the lower housing part and is spaced further apart from the roof when the upper housing part is raised so as to provide a space between the roof and support to receive the water tank at the upper part of the upper housing part.



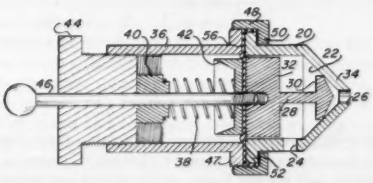
4,077,569
FLUID-FLOW PULSATOR

Siegmund Deines, Ft. Collins, Colo., assignor to Teledyne Industries, Inc., Ft. Collins, Colo.

Filed Oct. 4, 1976, Ser. No. 729,010

Int. Cl.[2] B05B *1/08*

U.S. Cl. 239—101 **22 Claims**



1. A fluid-flow pulsator comprising:

a housing defining an internal chamber and having means defining an inlet and an outlet each communicating with said chamber, said inlet admitting said fluid under a predetermined substantially constant static pressure thereof and said outlet releasing said fluid from said chamber;

means for supplying said fluid under said predetermined substantially constant static pressure;

a piston assembly mounted for movement within said housing, said assembly including a first piston spaced a fixed distance during operation from a second piston effectively toward said outlet and with said first piston having a first area, exposed within said chamber to pressure of fluid introduced therein through said inlet, less than a corresponding second area of said second piston;

means associated with said assembly for valvingly closing said outlet when said assembly is moved theretoward;

means for resiliently urging said assembly in a direction effecting closure of said outlet with said first and second pistons effectively being disposed in said chamber on opposite sides of said inlet;

said pressure within said chamber, the strength of said urging means and said areas being correlated to produce and are essentially determinative of the production of pulses of fluid from said outlet in response to a supply of fluid to said inlet, said pressure acting on said second area creating a first force tending to move said assembly in a direction to effect opening of said outlet, said pressure acting on said first area creating a second force tending to move said assembly in a direction to effect closure of said opening, the strength of said urging means acting on said second piston creating a third force tending to move said assembly in a direction to effect closure of said opening, and a fourth force tending to move said assembly in a direction to effect opening of said outlet with said fourth force equaling the sum of said second and third forces during closure of said opening but being created by said pressure acting on said first area during opening of said outlet;

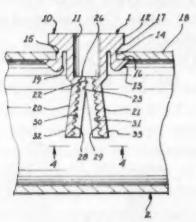
and said pressure, said strength and said areas being selected so that said assembly moves in the opening direction when said first force exceeds the sum of said second and third forces and moves in the closing direction when the sum of said first and fourth forces falls below the sum of said second and third forces existing upon opening of said outlet.

4,077,570

PENETRABLY MOUNTED EMITTER FOR CONDUITS

Richard C. Harmony, Tucson, Ariz., assignor to Harmony Emitter Company, Inc., Tucson, Ariz.

Filed May 26, 1976, Ser. No. 690,168
Int. Cl.² B05B *1/32*
U.S. Cl. 239—107 **24 Claims**



1. An emitter for discharging fluid from a fluid conveying conduit at a constant rate despite changes in pressure within the conduit, said emitter being penetratingly insertable within an aperture in the wall of the conduit, said emitter comprising:

a. a head including a discharge outlet having an axis normal to the wall of the conduit for conveying fluid from within the conduit and through the wall of the conduit;

b. an annular channel disposed about said head for receivingly engaging the edge of the aperture in the wall of the conduit;

c. an annular flange disposed adjacent said channel for contactingly engaging the inner wall surface of the conduit adjacent the aperture to maintain said emitter in place; and

d. bias means extending from said head interior to the conduit for maintaining a constant rate of fluid flow through said discharge outlet despite variations in pressure within the conduit, said bias means being disposed in axial alignment with said discharge outlet, said bias means including a pair of opposed skirts longitudinally separable from one another for defining a single passageway for the flow of fluid to said discharge outlet, said passageway being in general axial alignment with said discharge outlet;

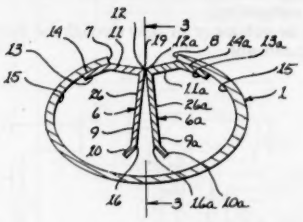
whereby, said emitter is penetratingly mountable within an aperture in the conduit to maintain a constant rate of fluid discharge from the conduit despite variations in fluid pressure within the conduit.

4,077,571

FLUID FLOW REGULATOR

Richard C. Harmony, Tucson, Ariz., assignor to Harmony Emitter Company, Tucson, Ariz.

Continuation of Ser. No. 604,146, Aug. 13, 1975, Pat. No. 3,993,248. This application Nov. 23, 1976, Ser. No. 744,291
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.² B05B *1/20*
U.S. Cl. 239—107 **16 Claims**



1. A fluid flow regulator for maintaining a constant fluid discharge rate through an aperture of a conduit conveying fluid under pressure, said regulator comprising in combination:

a. a fluid discharge outlet for discharging fluid from within the conduit, said outlet being generally coincident with the wall of the conduit;

b. a pair of opposed flexible elements depending from opposite sides of said outlet for defining a passageway from within the conduit to said outlet, said pair of opposed flexible elements being flexibly responsive to variations in fluid pressure within the conduit for proportionally constricting said passageway; and

c. means for establishing a pressure gradient within said passageway as a function of the water pressure within the conduit;

whereby, the rate of fluid discharge through said outlet is maintained at a constant rate despite variations in pressure within the conduit.

4,077,572

REDUCED SIZE ALTITUDE INSENSITIVE THRUST VECTOR CONTROL NOZZLE

Robert Edward Fitzgerald, Wethersfield, Conn., assignor to Chandler Evans Inc., West Hartford, Conn.

Filed Mar. 25, 1976, Ser. No. 670,164
Int. Cl.² B63H *25/46*; B64C *15/10*
U.S. Cl. 239—265.17 **7 Claims**

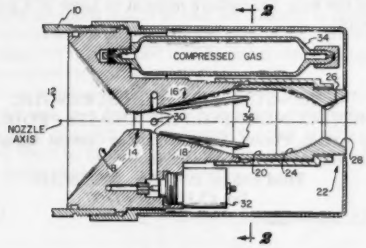
1. A thrust vector control nozzle arrangement which comprises:

a nozzle having: a throat section with a converging - diverging interior wall; a deflection section connected to the downstream end of the throat section with an interior wall comprising a first divergent interior wall portion and a second interior wall portion downstream of the first wall portion, the first wall portion having a greater divergence than the second wall portion; and an extension section connected to the downstream end of the deflection section with a convergent interior wall portion which terminates to define a flow restricting orifice;

means to cause a jet exhaust stream of gas to emanate from the throat section and separate from the first divergent interior wall portion of the deflection section, the orifice

being sized to elevate the pressure in the deflection section above ambient pressure;

at least one control port in the first divergent interior wall portion of the deflection section located in the vicinity of the unattached jet exhaust stream separation location to



deliver a control flow for causing the jet exhaust stream to deflect and attach to an area of the first divergent interior wall portion opposite the port;

a source of pressurized control gas; and

valve means to establish and terminate fluid communication between pressurized control gas and the control port.

4,077,573

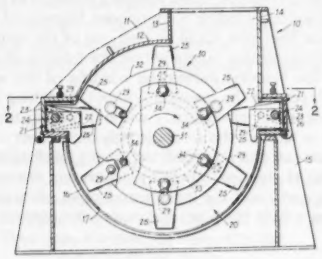
INDEPENDENTLY MOUNTED THRESHER CUTTERS

Carl H. Kersey, and Charles D. Hansen, both of Richmond, Va., assignors to AMF Incorporated, White Plains, N.Y.

Continuation of Ser. No. 651,884, Jan. 23, 1976, abandoned. This application Jan. 17, 1977, Ser. No. 759,706

Int. Cl.² B02C *18/18*

U.S. Cl. 241—32 **7 Claims**



1. In a thresher, the combination comprising

plate means connected together by tie rods and being provided with a spaced series of mounting plates and a slot adjacent each of said mounting plates,

a plurality of cutters each adjacent one of said series of mounting plates, and having one end disposed in one of said slots and extending outwardly from said plate means,

a plurality of removable fastening means each rotatably connecting a different one of said cutters to the adjacent mounting plate, and

each cutter having means to prevent rotation until a predetermined amount of force imposed on said cutter is exceeded and to permit rotation on said fastening means thereafter.

4,077,574

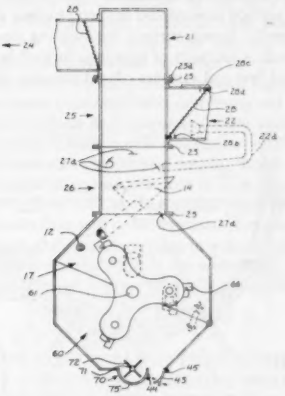
IMPACT PULVERIZING MILL WITH AN ATTRITION CHAMBER AND A VERTICAL AIRFLOW CLASSIFICATION CHAMBER

Peter M. Francis, Las Vegas, Nev., assignor to Industrial Mining Machinery Company, Las Vegas, Nev.

Filed Apr. 13, 1976, Ser. No. 676,478

Int. Cl.² B02C *23/30*

U.S. Cl. 241—52 **5 Claims**



1. An impact attrition mill, comprising:

a closed horizontally disposed octagon-shaped reduction chamber having a motor driven impact rotor concentrically mounted within to provide an intake space at one side and adjacent the top of the chamber, the rotor having radially extending vanes and rotating toward and down through the intake space;

access door means located in the bottom of the reduction chamber;

a gravity feed intake chute disposed above the primary reduction chamber and communicating therewith to supply material tangentially onto the top of the rotor and to the intake space;

a plurality of lining plates disposed within the primary reduction chamber opposite the rotor adjacent the receiving space and positioned so that ore particles will be flung by the rotor against the lining plates;

an attrition chamber located in a direct vertical line above the primary reduction chamber on the side opposite the ore receiving space and communicating with the reduction chamber to receive the flow of particles from the lining plates and containing means obstructing a straight line passage of particles from the impact chamber through the attrition chamber to a particle classification chamber with outlet means.

4,077,575

SECURING MEANS OF REPLACEABLE WEARING PLATES IN SMASHING MACHINES

Josef Tillmanns, Dusseldorf, Germany, assignor to Lindemann Maschinenfabrik GmbH, Dusseldorf, Germany

Continuation-in-part of Ser. No. 544,313, Jan. 27, 1975, abandoned. This application Nov. 18, 1976, Ser. No. 743,066

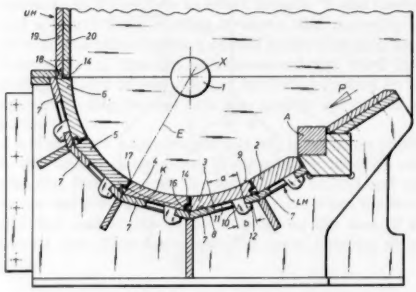
Claims priority, application Germany, Feb. 9, 1974, 2406204

Int. Cl.² B02C *13/282*

U.S. Cl. 241—285 A **5 Claims**

1. In a material smashing machine including a housing wall having an inwardly facing and an outwardly facing surface, and a plurality or replaceable wearing plates mounted on said inwardly facing surface, each said wearing plate having an inwardly facing surface, an outwardly facing surface, a first end surface, and a second end surface facing in the opposite

direction to said first end surface, said inwardly facing surface of the said wearing plates providing the surface on which the material is smashed, and said outwardly facing surface of said wearing plates being mounted on said inwardly facing surface of said housing wall, the improvement comprising a plurality of cranked fingers extending from said outwardly facing surfaces of said wearing plates, at least one said cranked finger extending from each of said wearing plates, each of said cranked fingers comprising an outwardly extending main portion and an extension projecting at substantially right angles to said main portion toward said first end surface and spaced from the outwardly facing surface for holding contact with said housing wall, a plurality of openings formed in each of certain ones of said first end surfaces of said wearing plates, a plurality



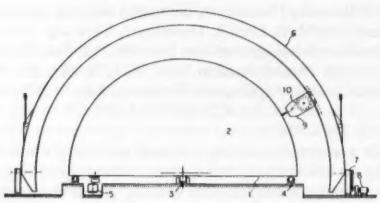
of projections formed in each of said second end surfaces of said wearing plates for tight engagement in said plurality of openings, said plurality of openings of one said wearing plate receiving said plurality of projections in an adjacent said wearing plate, and a plurality of slots formed in said housing wall for allowing the passage of said plurality of cranked fingers therethrough, each of said slots having a first end nearer said first end surface of one of said wearing plates and a second end remote from said first end and closer to the second end surface of the one of said wearing plates, each of said cranked fingers being mounted near said first end surface of one of the certain ones of said wearing plates, and having said extension in contact with said outwardly facing surface of said housing wall, whereby said wearing plates are held together and to the housing wall during the smashing of the material.

4,077,576

MACHINE FOR CONTINUOUS GLASS FILAMENT WINDING OF LARGE BONDED FIBERGLASS STRUCTURES, SUCH AS CRYOGENIC TANKS FOR LIQUID NATURAL GAS

William H. Cook, Jr., 875 SE. Shoreland Dr., Bellevue, Wash. 98004

Filed Dec. 30, 1976, Ser. No. 755,817
Int. Cl.² B65H *54/64*
U.S. Cl. 242—3 **2 Claims**



1. A machine for the continuous fiberglass filament or tape winding of large hemispheres to be used in pairs for tanks, comprising:

a. a male hemispheric mold or the like;

b. a horizontal turntable rotating about a vertical pivot axis to rotate the male mold to be wrapped with fiberglass filaments, made up into a tape;

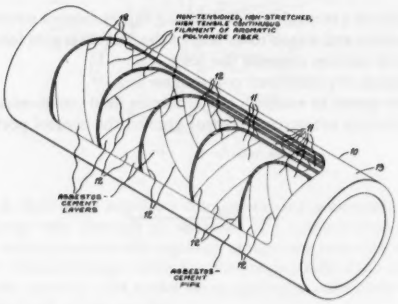
c. a bobbin, to distribute the fiberglass tape over the surface of the male hemisphere mold at or close to a great circle path.

4,077,577

NON-STRESSED, HIGH STRENGTH, CEMENT-CONTAINING PIPE AND ITS PRODUCTION

James Wright, Pinson, Ala., assignor to Cement Asbestos Products Company, Birmingham, Ala.

Filed Feb. 4, 1976, Ser. No. 655,189
Int. Cl.² B65H *81/00*
U.S. Cl. 242—7.22 **21 Claims**


NON-TENSIONED, NON-STRETCHED, HIGH TENSILE CONTINUOUS FILAMENT OF AROMATIC POLYAMIDE FIBER
ASBESTOS-CEMENT LAYERS
ASBESTOS-CEMENT PIPE

1. A method for producing non-stressed, reinforced, rigid, substantially inflexible, asbestos-cement pipe well adapted for conveying water under pressure which comprises forming a wet asbestos-cement sheet from an aqueous asbestos fiber-cement slurry, removing water from the wet asbestos-cement sheet, winding the de-watered, still wet sheet on a pipe-forming mandrel as a plurality of spirally wound, wet asbestos-cement layers thereon while applying pressure to the wet sheet on the mandrel, winding a continuous filament of an aromatic polyamide fiber taut about at least one of the spirally wound, wet asbestos-cement layers within the interior of the ultimate pipe on the mandrel during the winding of the wet asbestos-cement layers on the mandrel without stretching the continuous filament and substantially without placing the continuous filament in tension, the aromatic polyamide fiber of the continuous filament characterized by having high tensile strength and a low elongation capability, separating the mandrel from the inner surface of the thus-formed pipe, extracting the mandrel from within the pipe, and curing the pipe.

4,077,578

MACHINE FOR WINDING HOLLOW FILAMENTS

Harry W. Cromie, Pittsburgh, Pa.; James A. Fitzgerald, McHenry; Clinton V. Kopp, Barrington, and Freddie L. Washington, Waukegan, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Feb. 13, 1976, Ser. No. 658,141
Int. Cl.² B65H *54/02, 54/28*
U.S. Cl. 242—18 G **10 Claims**

1. A machine for unwinding a filament from a spool and for winding a filament on a take-up reel in a controlled manner, said machine having:

a body;

spool-mounting means on said body for rotatably supporting a spool of filament to be unwound;

take-up reel means rotatably mounted to said body for wind-

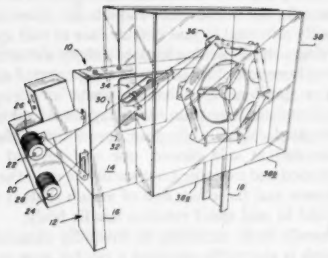
ing said filament thereon and having at least two radially-spaced support means thereon about which said filament is wound;

guide means mounted to said body and positioned in relation to said spool-mounting means and take-up reel means for guiding a filament as it is wound on said take-up reel means;

control means for moving the guide means to controllably position the guide means so that the filament is controllably wound and positioned on the take-up reel means;

drive means for rotating said take-up reel means, wherein the improvement comprises:

said filament being continuous, hollow and semipermeable and for use in a hollow fiber dialyzer, which dialyzer includes a plurality of substantially equal length open-ended fibers formed from said filament and having liquid flow paths about the fibers thereof;



said machine being adapted to apply said filament to said take-up reel means in a manner so as to assure the provision of liquid flow paths, wherein

said guide means include an elongated arm having a rearward end pivotally secured with respect to said body and a movable forward end with filament guide elements mounted thereto;

reciprocable rod means are provided and are secured at one end to said arm at a position intermediate the ends of said arm and cooperatively associated at the other end with said control means; and

said control means for moving said arm, being cooperatively associated with said take-up reel means, and being shaped and constructed to oscillate said arm at a rate, related to the rate of rotation of the take-up reel means, and effective to prevent close packing of adjacent filament windings while also assuring loose and controlled winding of said filament.

4,077,579

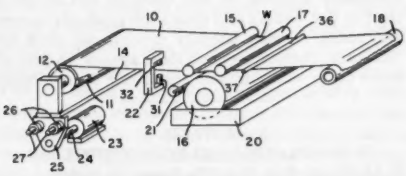
EDGE ALIGNMENT APPARATUS

Richard C. Seleski, Glen Cove; Glenn E. Peterson, Carle Place, and William J. Schoenlein, Levittown, all of N.Y., assignors to Columbia Ribbon & Carbon Mfg. Co., Inc., Glen Cove, N.Y.

Filed Apr. 12, 1976, Ser. No. 676,300

Int. Cl.² B65H *25/26*

U.S. Cl. 242—57.1 **8 Claims**



1. An apparatus for checking and correcting the alignment of a continuous web or fabric material adapted to be supported in and moved through said apparatus, comprising a frame, a smooth shaft attached to said frame, a laterally-movable carriage slidably attached to said shaft and adapted to support said web, photoelectric sensing means mounted on said frame comprising a photoelectric light source and a photocell spaced therefrom and adapted to receive a continuous light beam from said light source and to sense variations in the level of illumination received from said light source during operation of said apparatus, said sensing means being so positioned that one edge of a continuous moving web passing therethrough is adapted to block a predetermined partial portion of the light beam between said light source and said photocell when said moving web is in centered position, means for moving said web through said sensing means so that one edge thereof normally blocks a predetermined partial portion of said light beam, a bi-directional solenoid associated with said frame and with said laterally-movable carriage and adapted to slide said carriage laterally on said smooth shaft in either direction relative to said frame, and means associated with said sensing means and with said solenoid for activating said solenoid to slide said carriage in a direction away from said sensing means when the edge of the web blocks more than said predetermined partial portion of said light beam and to slide said carriage in a direction towards said sensing means when the edge of the web blocks less than said predetermined partial portion of said light beam.

4,077,580

METHOD FOR CONTROLLING THE ON-THE-FLY SPLICING OF A WEB FROM A SECOND ROLL TO A WEB RUNNING OFF A FIRST ROLL

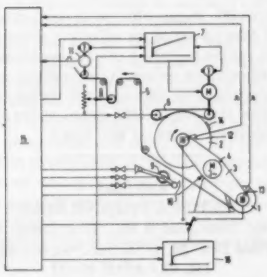
Rainer Lang; Horst Matthiesen, both of Erlangen, and Manfred Rubruck, Igelsdorf, all of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Jan. 13, 1977, Ser. No. 759,245

Claims priority, application Germany, Apr. 30, 1976, 2619236

Int. Cl.² B65H *19/12*

U.S. Cl. 242—58.2 **3 Claims**



1. In a method for controlling the on-the-fly splicing of a web wound on a first roll to a web wound on a second roll, wherein the first roll is being unwound and the second roll is set in rotation and wherein mechanical members are associated with the carrying out of the method and the method includes:

transferring a roll carrier supporting the first and second rolls from the unwind position to the pasting position, when the first roll reaches one of a first diameter and first circumference value;

accelerating the second roll until its peripheral velocity is equal to the velocity of the unwinding web on the first roll, when the first roll reaches one of a first diameter and first circumference value;

accelerating the second roll until its peripheral velocity is equal to the velocity of the unwinding web on the first roll, when the first roll reaches one of a second diameter and second circumference value; and

operating a pasting and cutting means for pasting the web of the second roll beginning at the pasting tip of the web of

the second roll, to the web running off the first roll and for cutting the web running off the first roll at the end of the pasting tab formed by the pasted section of the first and second rolls when the first roll reaches one of a third diameter and third circumference value; and wherein the improvement comprises:

continuously calculating said values from a predetermined value for the end diameter of said first roll, a predetermined value for the length of the pasting tab, from one of predetermined and measured time constants of the mechanical members carrying out said method, and from the actual values for the velocity of the web of said first roll and for the rotation of said first roll.

4,077,581

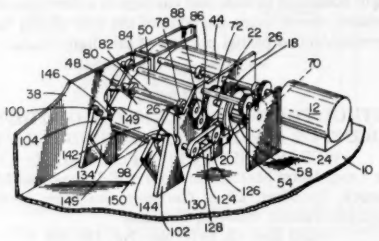
PAPER DRIVE MECHANISM

Kim R. Lewis, Lansing, and William H. Corbett, Ithaca, both of N.Y., assignors to NCR Corporation, Dayton, Ohio

Filed Dec. 8, 1975, Ser. No. 638,797

Int. Cl.[2] B65H *17/08*

U.S. Cl. 242—67.3 R **6 Claims**



1. Drive mechanism for advancing record media from a supply spool to a take-up spool, comprising

drive means,

means selectively engageable with said drive means and with said take-up spool for effecting drive therebetween, said drive means including clutch mechanism for activating said engageable means in intermittent operation and

means supporting said take-up sool permitting movement thereof from said engageable means as the diameter of the record media increases on said spool.

4,077,582

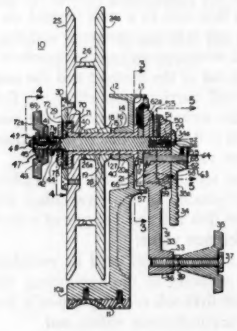
DEEP SEA FISHING REEL

Merton B. Way, 5300 John R Rd., Troy, Mich. 48084

Filed Dec. 30, 1975, Ser. No. 645,384

Int. Cl.[2] A01K *89/02*

U.S. Cl. 242—219 **2 Claims**



1. In a fishing reel, the combination of, an elongated reel spool to fishing rod hanger means having a base reel mounting portion at one end and a reel spool supporting portion having an internal bore, a ratchet gear face and a hub face at the other end;

ratchet gear means including a sleeve portion fixedly mounted in said hanger internal bore with a substantial portion of said sleeve extending outwardly from said reel supporting portion and a gear tooth portion formed inwardly from said reel supporting portion adjacent said hub face, said gear tooth portion having a plurality of external teeth each tooth having an inclined portion sloped radially in one direction and a portion generally non-sloped radially in the other direction;

a reel spool means including a generally large diameter flat spool member having an annular recessed fishing line holding portion, a hub portion including an internal centrally located bearing portion rotatably journaled on the outside periphery of said extended portion of said sleeve a generally flat outside face and a brake drum plate element fixedly mounted to said outside face of said spool member having a shaft opening located axially with respect to said spool bore; spool rotation and drag control means including a spool rotation handle body, an elongated spool rotation handle portion extending from said body, and an elongated laterally floating spool drive shaft member journaled in said sleeve, one end of said shaft being threaded and extending outwardly beyond the brake drum element and the other end of which shaft is fixedly connected to said spool rotation handle body;

said handle body including an inwardly directed face upon which is pivotably mounted a ratchet gear pawl member spring biased towards said teeth of said gear toothed portion and fixed to rotate with said body so that as said handle body is rotated by said handle said pawl alternatively slides over said inclined portion of a tooth in one rotational direction or engages a non-sloped face of said gear tooth stopping rotation in the other rotational direction;

drag and spool release means including a release member and a drag release bolt member having one end fixedly fastened to said lever member and the other end extending parallel to but off center of said drive shaft extending through said handle body, said other end terminating generally flush with the internal face of said handle body, a pawl release element connected to said drag bolt other end adjacent said pawl so that rotation of said lever actuates said release element to move said pawl in or out of engagement with said gear teeth;

and adjustable drag means associated with the end of said drive shaft member including a pair of generally thin friction fiber brake shoe axially mounted on said shaft straddling the sides of said drum plate element, a generally flat friction shoe engaging disc portion fixedly mounted to rotate with said drive shaft member adjacent the inwardly located friction shoe, an outwardly located floating friction shoe engaging disc member constrained to rotate with said shaft but free to move laterally axially on said drive shaft adjacent to said outwardly located brake disc, a spring element mounted on said drive shaft adjacent said outwardly located brake disc, a drag adjusting knob threadably mounted on said threaded end of said drive shaft so that turning said drag knob gradually compresses said spring element laterally moving said discs toward each other compressing said shoes against the sides of said brake drum with manually regulatable equal pressure.

4,077,583

NON-ROTATING SKI-ROPE RETRIEVER

Lee R. McGinnis, P.O. Box 205, Loami, Ill. 62661

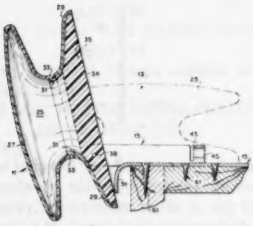
Filed Sep. 8, 1975, Ser. No. 611,358

Int. Cl.[2] B65H *75/40*; B63B *21/56*

U.S. Cl. 242—85.1 **10 Claims**

1. A ski-rope retriever comprising: a non-rotating reel-

shaped drum having two peripheral flanges defining an annular pocket, generally U-shaped in transverse cross-section, adapted to receive a ski rope manually wound therein; a support adapted for attachment to rear stern structure of a towing boat or the like; said drum and said support having cooperating



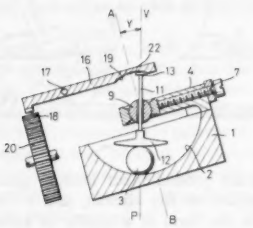
means defining a horizontal-axis hinge and limiting movement of said drum between a rearwardly facing generally vertical position for circumferential overedge paying-out rope and a generally horizontal folded-down position for facilitating manual winding-up and for secure storage of said rope.

4,077,584

SELF-REGULATING DEVICE FOR THE AUTOMATIC LOCKING OF SAFETY BELT WINDING REELS

Raymond Lafont, Paris, France, assignor to B.S.G. International Limited, Birmingham, England

Filed Jun. 1, 1976, Ser. No. 691,877
Claims priority, application France, Jun. 2, 1975, 75 17179
Int. Cl.² A62B *35/02;* B65H *75/48*
U.S. Cl. 242—107.4 A **13 Claims**



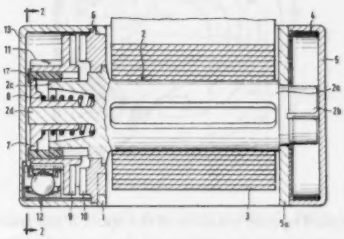
1. A safety belt reel locking mechanism with a self-adjustment device to compensate for different orientations of said mechanism, said mechanism comprising support means, an inertial member mounted on said support means for movement in response to sudden movement; articulation means generally in overlying relation to said support means; means mounting said articulation means for free pivotal movement with respect to said support means, a transmission element slidably mounted on said articulation means and centered with respect thereto such that a sliding axis of said transmission element automatically assumes through gravity on installation of said device an optimum preferred orientation with respect to said support means; means for fixedly securing said articulation means in said optimum preferred orientation; and means responsive to the sliding movement of said transmission element due to said sudden movement for locking the safety belt reel.

4,077,585

INERTIA TYPE WIND UP DEVICE FOR SAFETY WEB BELT

Josef Wiesbock, Dachau, Germany, assignor to Firma Hans Kolb GmbH & Co., Grobberghofen, Germany

Filed Nov. 4, 1976, Ser. No. 738,739
Int. Cl.² A62B *35/02;* B65H *75/48*
U.S. Cl. 242—107.4 B **5 Claims**



5. A device for rolling up a belt of a safety belt assembly for vehicles or the like, said device comprising, a housing, a winding shaft rotatably mounted in said housing, a wind up spring connected between said housing and said shaft and for biasing the latter in one direction of rotation, an inertia blocking wheel rotatably mounted on said winding shaft at one end thereof, an angle-shape recess in said one end of said shaft and in axially and radially opening directions therefrom, said recess having an oblique cam engaging surface, an axially extending hook-like projection carried by said blocking wheel and shiftably located in said recess, said projection having an inclined oblique cam surface which is complementary to and interengaging with said recess cam engaging surface for relative movement between said surfaces upon relative movement between said shaft and said blocking wheel, said recess being larger than said projection whereby said hook-like projection is inserted axially into and located in said angle-shape recess in bayonet-connection-fashion for rotation by shifting therein and between blocking and release positions, said blocking wheel being shiftable within limits in an axial direction in respect to said shaft, interengaging blocking elements carried by said blocking wheel and said housing and facing one another so that said elements (1) are disengaged when said blocking wheel is shifted axially away from said shaft end, (2) and are engaged upon acceleration of said shaft in the other direction of rotation against the bias of said spring and said oblique surfaces move relative to one another and said blocking wheel consequently shifts axially towards said shaft end and prevents said shaft from further rotation in said other direction of rotation relative to said housing.

4,077,586

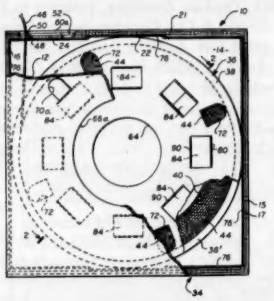
DROP WIRE PAYOUT APPARATUS

Robert M. Thomas, Florham Park, and John R. Reiser, Piscataway, both of N.J., assignors to General Cable Corporation, Greenwich, Conn.

Filed May 26, 1976, Ser. No. 690,015
Int. Cl.² B65H *49/00, 49/18;* D01H *7/16*
U.S. Cl. 242—129.5 **8 Claims**

1. Wire payout apparatus including in combination a box, a spool for wire, the spool having flanges and being of a size to fit loosely in the box with the flanges adjacent to inside surfaces of the box, an end of the box having an opening therein through which wire can be pulled from the box in a direction tangent to a reel of wire wrapped on the spool, the spool being supported from an underlying portion of the box and rotating with respect thereto, as wire is pulled from the spool when the box is in position for paying out wire, characterized by the spool being supported only by contact of a flange of the spool with an underlying portion of the box on which said flange seats, said box being a throw-away shipping container for the

spool of wire, and means located between the spool and the supporting portion of the box for reducing friction below that



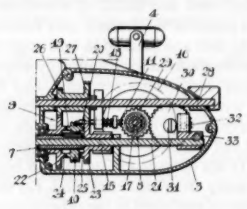
which would oppose rotation of the spool if the spool were in direct contact with the portion of the box under the spool.

4,077,587

SPIN CASTING REEL

Sueo Ueda, Tateyama, Japan, assignor to Yoshiya Nishizaki, Japan

Filed Dec. 22, 1976, Ser. No. 753,571
Int. Cl.² E04G *3/00*
U.S. Cl. 242—215 **9 Claims**



1. In a spin casting reel having a bobbin and a bobbin rotor adjacent thereto, a rotor shaft connected with and extending from said rotor, a rotary drive shaft means having a handle connected thereto for manually rotating the same, support means supporting said drive shaft means for rotary movement as well as for axial movement between high and low speed positions, an input gear coaxially surrounding said drive shaft means and supported by said support means for rotary movement, said drive shaft means being operatively connected with said input gear for rotating the same in both positions of said drive shaft means, change-gear transmission means extending between and operatively connected with said input gear and rotor shaft for transmitting rotation from said input gear to said rotor shaft when said input gear is rotated upon turning of said drive shaft means, said change-gear transmission means including a clutch means having high and low speed positions in which said transmission means respectively provides high and low speed transmission ratios from said input gear to said rotor shaft, and cam means operatively connected to said drive shaft means for axial movement therewith and connected with said clutch means for respectively placing the latter in said high and low speed positions thereof when said drive shaft means is axially displaced between said high and low speed positions thereof.

4,077,588

PERMANENTLY BUOYANT BALLOON

Gerald L. Hurst, 1401 Spring Garden, Austin, Tex. 78746

Filed Sep. 15, 1975, Ser. No. 613,518
Int. Cl.² B64B *1/40*
U.S. Cl. 244—31 **17 Claims**

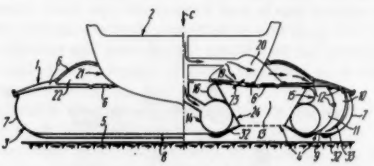
1. A substantially permanently air buoyant balloon comprising a substantially gas impermeable envelope filled with a lighter than air gas at about atmospheric pressure, said envelope being made from attached panels of a composite material comprising at least one nonelastomeric polymer sheet continuous throughout said panel which has a continuous opaque coating of a vapor deposited metal on at least one side thereof, said panels being attached to form said envelope by continuous seals along peripheral portions thereof, said envelope having an internal volume of up to about 20 cu. ft. and having a ratio of its volume taken to the two-thirds power to its surface area of from about 0.21 to about 0.01, and an average envelope weight in the range of from about 2.6×10^{-4} gm/cm² to about 1.7×10^{-4} gm/cm².

4,077,589

GROUND-EFFECT LANDING GEAR FOR AIRCRAFT

Alexei Yakovlevich Belolipetsky, Kremenetskaya ulitsa, 3/11, kv. 65; Pavel Afanasievich Levochkin, ulitsa akademika Tupoleva, 26/16, kv. 27; Ivan Ivanovich Jurkovsky, ulitsa Dorogozhitskaya, 15b, kv. 51, all of Kiev, U.S.S.R., and Boris Makarovich Kolomiets, deceased, late of Kiev, U.S.S.R. (by Lidia Vasilivna Kolomiets, administrator)

Filed Nov. 2, 1976, Ser. No. 738,057
Int. Cl.² B60V *3/08*
U.S. Cl. 244—100 A **4 Claims**



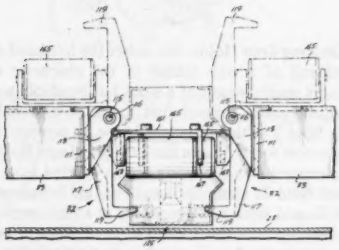
1. An aircraft ground-effect landing gear comprising: a platform mounted to the aircraft; and a flexible enclosure constructed in the form of a system of inflatable envelopes attached to said platform and arranged to bound thereunderneath an overpressure space near the ground surface communicating during transition to hovering and during movement of the aircraft with a compressed air source said flexible enclosure being formed by: an outer wall which is continuous in the plan view and is attached around the perimeter of its upper edge to said platform, a flat bottom joined around the perimeter to the lower edge of said outer wall, and at least one circular partition mounted equidistantly from the outer wall in the space bounded by said outer wall, bottom and platform and arranged to divide said space into at least two concentric spaces communicating with each other; a lower edge of said circular partition and said flat bottom joined with said lower edge of said outer wall forming an inner portion of said flexible enclosure which is mounted in the space bounded by the circular partition and located equidistantly from the circular partition and also having means adapted to divide the air cushion space into separate radial sections arranged so that they communicate successively

with one another for the compressed air to pass from the rearward sections as viewed in the direction of flight, into the adjacent forward sections.

4,077,590
INTEGRATED TREADWAY CARGO HANDLING SYSTEM

Thomas H. Shorey, Freeland, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Mar. 11, 1976, Ser. No. 665,765
Int. Cl.[2] B60P *1/00*
U.S. Cl. 244—118 R 29 Claims



1. An integrated treadway cargo handling system for converting, after the removal of predetermined passenger amenities, an aircraft from passenger use to cargo use, said integrated treadway cargo handling system comprising:

a plurality of treadway panels suitable for being arranged in a predetermined array on the deck of an aircraft, certain of said panels being disposed such that their adjacent edges are parallel, but spaced-apart, said spacing being such that a recess is formed that extends along and between said adjacent edges;

attachment means for attaching said plurality of treadway panels to said deck of an aircraft in said predetermined array;

a plurality of guide rail means, each of which is rotatably mounted on a separate one of said certain panels along said adjacent edge thereof for rotation between a retracted out-of-the-way position and an extended operative position, said guide rail means lying in said recess when in said retracted out-of-the-way position and protruding above upper surfaces of said certain panels when in said extended operative position for guiding cargo pallets to and from transportation positions; and

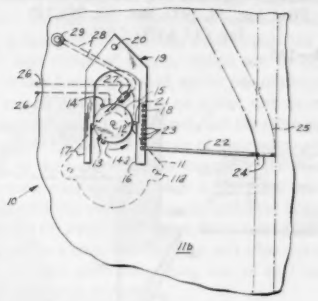
latching means for each of said guide rail means for releasably latching each of said guide rail means in their extended position.

4,077,591
ELECTRIC SWITCH MACHINE FOR MODEL RAILROADS

Elmer C. Ray, 8810 Maryland Ave., Marmet, W. Va. 25315

Filed Jun. 30, 1977, Ser. No. 811,766
Int. Cl.[2] E01B *7/02*
U.S. Cl. 246—415 A 4 Claims

1. An electric switch machine for model railroads, comprising a disc cam secured to a motor shaft, said disc cam having spaced apart pins on its face for opening and closing a microswitch, and pin means on the outer periphery of said disc cam for pivoting a "U" shaped cam follower, and push-rod means secured to said cam follower, and to a fixed track member for

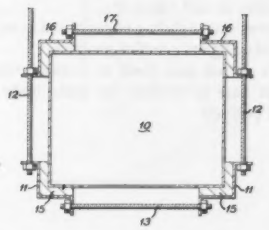


intermittently engaging and disengaging a track from another track.

4,077,592
SUPPORTING OF DUCTING

George Alfred Forbes, 75 Ellerby St., London S.W.6., England

Filed Jan. 21, 1976, Ser. No. 651,022
Claims priority, application United Kingdom, Jan. 29, 1975, 3864/75; Apr. 1, 1975, 13135/75; May 23, 1975, 22751/75
Int. Cl.[2] F16L *3/00*
U.S. Cl. 248—59 10 Claims



1. A supporting arrangement for rectangular-sectioned ducting comprising:

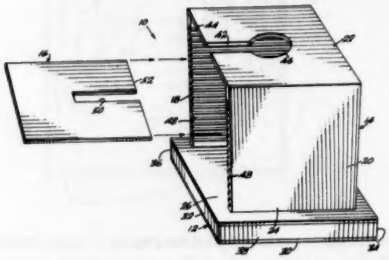
four angle elements in which the corners of the ducting are seated at a given position along the length of the ducting, each angle element comprising two mutually perpendicular webs and apertured flanges projecting from the respective webs at right angles thereto, the apertured flanges on the webs of the angle elements below the bottom wall of the ducting projecting upwardly towards said ducting bottom wall, the remaining webs of all of the angle elements projecting outwardly away from the adjacent ducting wall;

four substantially coplanar tie rods respectively extending parallel to the four walls of the ducting in spaced relationship thereto, each respective tie rod passing through the apertures of the flanges of respectively two angle elements located at adjacent corners of the ducting;

securing means on the tie rods acting against the flanges of the angle elements to clamp the ducting between the angle elements in each of two mutually perpendicular directions;

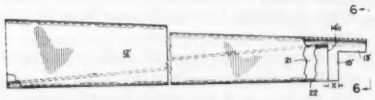
and suspension means attached to the uppermost tie rod to suspend the ducting from a building structure.

4,077,593
HOLDER FOR A PLANT CONTAINER
Alfredo Carratala, 301 NW. 47th Ave., Miami, Fla. 33126, and Julio Palomino, 19 Samana Dr., Miami, Fla. 33133
Filed Apr. 28, 1977, Ser. No. 791,723
Int. Cl.[2] A47G 7/02
U.S. Cl. 248—146 5 Claims



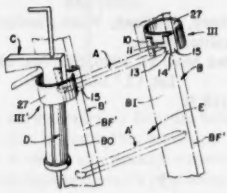
1. A holder for a pedestal type container having an upper main body container portion and a stem connecting between the main body portion and a support base, said holder comprising:
- a base portion,
- a pair of spaced apart, upstanding parallel walls, including bottom end portions fixed to said base portion, and top end portions,
- a top wall spanning the distance between and fixed to said top end portions,
- a plurality of vertically aligned inwardly confronting pairs of longitudinally extending parallel grooves in said side walls,
- means to supportingly nest the upper main body portion of the holder in said top wall,
- a shelf for selective sliding engagement in any of said pairs of vertically aligned parallel grooves,
- means to permit said shelf to engage over the container support base to confine the main body portion in said nested position.

4,077,594
CHAIR LEG BASE
Charles W. Saam, Ohio City, Ohio, assignor to Harter Corporation, Sturgis, Mich.
Division of Ser. No. 673,312, Apr. 5, 1976, Pat. No. 4,027,364.
This application Feb. 22, 1977, Ser. No. 770,584
Int. Cl.[2] F16M 11/20
U.S. Cl. 248—188.7 5 Claims



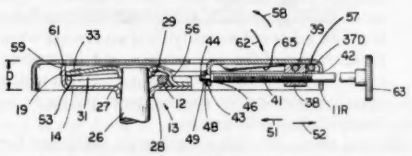
1. A tapered tubular chair leg having a top, bottom and side walls, said bottom wall having a reentrant groove forming an interior rib inclined with respect to said top and bottom walls and gradually increasing in height toward the smaller end of said tube, said rib being formed at said smaller end to embrace one side of a caster-mounting bushing disposed at right angles to said bottom wall.

4,077,595
CAULKING GUN HOLDER
Coleman J. Carter, 1001 Kayak Ave., SE., Hillside, and Arden Leonard, 5315 Altoona St., Capital Heights, both of Md. 20027
Filed Nov. 4, 1976, Ser. No. 738,974
Int. Cl.[2] E06C 7/14
U.S. Cl. 248—210 6 Claims



1. A Caulking Gun Holder for either the left-hand rail or the right-hand rail of a step ladder of the character described comprising a single length of a stout but bendable metal sheet having an integrally formed first flange, substantially in the shape of a Bold T with a broadened base, to provide a first step receiving recess formed from the left half of said Bold T and to provide a second step receiving recess formed from the right half of said Bold T; along the length of said broadened base of said Bold T, said Bold T is connected at a right angle to a web member that lies over the foward edge of either of said rails of said step ladder; said web member is connected at an acute angle to an arcuately formed caulking gun support second flange; and a rail receiving recess, substantially in the shape of the letter U with one of the arms of said letter U arcuately concaved inwards toward the other arm, is provided by the cooperation of said web member with said first flange and with said arcuately formed caulking gun support second flange.

4,077,596
LOW SILHOUETTE CHAIR TILTING CONTROL ASSEMBLY
Lon W. Pinaire, Evansville, Ind., and Robert H. Godwin, Evansville, Ind., assignors to Bliss & Laughlin Industries, Incorporated, Oak Brook, Ill.
Filed Jun. 18, 1975, Ser. No. 588,063
Int. Cl.[2] A45D 19/04
U.S. Cl. 248—379 23 Claims

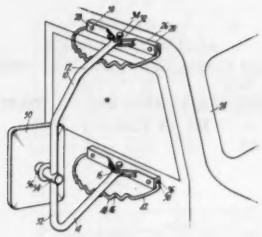


1. In a chair control assembly having base connector means and seat connector means mounted to said base connector means for pivoting on a horizontal axis, the improvement comprising:
- first and second horizontally spaced elongated spring members disposed between said base connector means and said seat connector means and applying force therebetween urging said seat connector means toward a stop condition with respect to said base connector means, said spring members being supported by fulcrum means between front and rear ends of said spring members,
- and linearly movable spring adjustment means mounted on one of said connector means and engaging the spring members and movable lengthwise of the spring members to change the resistance of said spring members to tilting of said seat connector means from said stop condition.

4,077,597
MIRROR

William Joseph Greig, 17 Sycamore St., Mentone, Victoria, Australia (3194)

Filed Jan. 26, 1976, Ser. No. 652,336
Claims priority, application Australia, Jan. 13, 1976, 4509/76
Int. Cl.[2] A47G *1/24*
U.S. Cl. 248—477 9 Claims

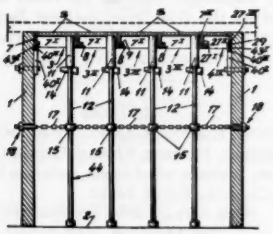


1. A vehicle mirror assembly comprising:
a. a mirror and mirror support frame supporting said mirror,
b. said support frame having an upper support arm and a lower support arm,
c. upper and lower attachment means having a structural configuration effective to be secured to a vehicle,
d. said upper support arm being pivotally connected to the upper attachment means and said lower support arm being pivotally connected to the lower attachment means, and
e. a mirror support spring extending outwardly from one of the attachment means, said attachment means comprising an elongate member having a bracket pivotally connected to one of the support arms, said support spring having two ends connected to respective ends of the elongate member,
f. said mirror support spring having at least one crimp therein to releasably engage the support arm at a location laterally displaced from the point the support arm is pivotally connected to the attachment means from which the support spring extends.

4,077,598
MEANS FOR MOLDING A ROOF OR FLOOR SLAB

Jorge Marseillan, Sarmiento 440, Buenos Aires, Argentina

Filed Oct. 7, 1976, Ser. No. 730,467
Claims priority, application Argentina, Oct. 7, 1975, 260721
Int. Cl.[2] E04G *11/46*
U.S. Cl. 249—19 9 Claims

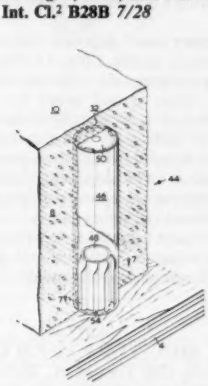


1. A form for slabs and the like, for moulding a roof or intermediate floor slab for a substantially rectangular enclosure, the form comprising a plurality of substantially rectangular panels each defining a substantially rectangular moulding surface, the panels being arranged in chess-board array to define a moulding surface adapted to extend over said enclosure, said plurality of panels comprising a first edge-panel and a series of panels, some of which are also edge-panels, said edge-panels being those which are positionable along an edge of said enclosure, said first edge-panel having at least one edge adapted to be rested against means defining said enclosure and supported by support means secured to said means defining said enclosure, the edges of this first edge-panel which are not adapted to rest against said means defining said enclosure comprising means for supporting a corresponding edge of the panels of said series of panels, which are to be positioned adjacent to said first edge-panel, all but one of the panels of this series of panels having means on either one or two of their edges to support an adjacent panel, and the edge-panels of said series of panels having at least one of their edges adapted to be supported by the support means secured to the means defining the enclosure; each panel which is provided with means to support an adjacent panel along two adjacent edges also comprising means for receiving a strut, these strut receiving means being formed in a corner defined by said adjacent edges, and a plurality of struts each supporting one of said panels which have strut receiving means.

4,077,599
DEVICE FOR FORMING APERTURES IN CONCRETE

John H. Oland, 6939 Farrell Rd. SE., Calgary, Alberta, Canada (T2H 0T3)

Continuation of Ser. No. 550,720, Feb. 18, 1975, abandoned.
This application Aug. 5, 1976, Ser. No. 711,881
Int. Cl.[2] B28B *7/28*
U.S. Cl. 249—177 13 Claims



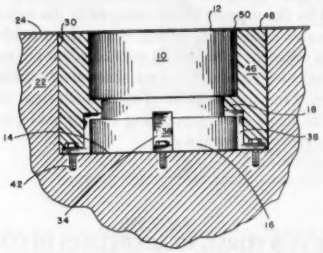
1. A device for holding a sleeve form for forming apertures in concrete during the pouring thereof comprising:
a form holder of plastic material adapted for securement to a concrete base form and being adapted to receive said sleeve form against the outer extremities of the holder;
said holder having a body with a tubular outer surface and a base closure portion integrally formed with said body;
an aperture in said base closure portion for passage therethrough of fastening means to secure the holder to the concrete base form;
the end of the body opposite the base closure portion being open for access to insert the fastening means and the interior of the body being tapered up to the periphery of the aperture to facilitate entry of the fastening means and strengthen the body;
a plurality of flexible, longitudinal rib members formed on said body and extending radially outwardly therefrom;
the outer dimension of said body being less than the inside dimension of the sleeve form, with the overall dimension of the holder, including the flexible ribs, being greater than the inside dimension of the sleeve form whereby said rib members will flex in a circumferential direction from engagement with the sleeve form to provide a frictional engagement therewith.

4,077,600

INGOT MOLD BASE MEMBER

Kenneth A. Gebler, Munster, Ind., assignor to Nalco Chemical Company, Oak Brook, Ill.

Continuation of Ser. No. 633,359, Nov. 19, 1975, Pat. No. 4,005,846. This application Nov. 11, 1976, Ser. No. 740,698
The portion of the term of this patent subsequent to Feb. 1, 1994, has been disclaimed.
Int. Cl.[2] B22D *7/06, 19/10*
U.S. Cl. 249—204 **3 Claims**



1. An ingot mold base member comprising:

(A) a cast iron base with a cavity formed within its top, said cavity having a bottom and a side running along its perimeter;

(B) a refractory insert disposed within said cavity, said refractory insert having a top, a bottom and a side running along its perimeter, said refractory insert of approximately the same shape as said cavity but of substantially less dimension, said insert thereby defining a channel between the side of said cavity and the side of said insert, said refractory insert containing a groove having a square cross section in its side, said groove having a bottom surface positioned approximately parallel to the bottom surface of said refractory insert;

(C) anchor means fastened to the bottom of said cavity and engaging at least a portion of said groove; and

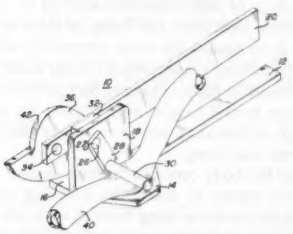
(D) a plastic refractory substantially filling said channel.

4,077,601

ADJUSTABLE PINCH CLAMP

George M. Dick, 1785 Trenton St., Denver, Colo. 80220

Filed Dec. 13, 1976, Ser. No. 749,816
Int. Cl.[2] F16K *7/06*
U.S. Cl. 251—9 **2 Claims**



1. In an adjustable clamp, the combination of:

a relatively fixed handle means having an upright member positioned adjacent one end with a laterally positioned base member extending to each side thereof;

a movable handle means pivotally connected to one side of the upright member by means of a shaft journalled therein;

a crank arm with one end thereof connected to the shaft positioned to the other side of the upright member, with said crank arm having an extension connected to the end thereof opposite the shaft, extending substantially parallel thereto and adapted to cooperate with the base member to clamp a conduit therebetween; and,

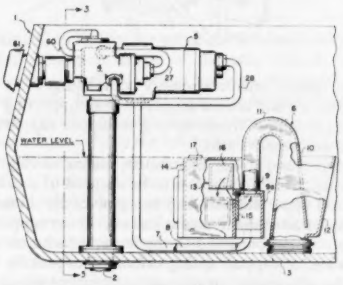
movable cam means mounted near the one end of the fixed handle means and adapted to engage a portion of the base member to control the opening movement of the movable handle means relative to the fixed handle means and thus the crank arm extension with respect to a portion of the base member.

4,077,602

ACTUATING VALVE

Clarence Edward Klessig, Sheboygan, Wis., assignor to Kohler Co., Kohler, Wis.

Filed Jun. 29, 1976, Ser. No. 700,911
Int. Cl. F16k *31/124*
U.S. Cl. 251—25 **7 Claims**



1. In a control system for a siphon-type flush valve which control system comprises a control valve which utilizes supply line pressure upon the rear face of a piston positioned in the control valve to stop the flow of supply water through the control valve, a bypass circuit to transfer supply line pressure to the rear face of the piston, and an actuating valve which upon triggering interrupts the transfer of pressure through the bypass circuit, the improved actuating valve which comprises:

(a) a triggering mechanism;

(b) a valve housing having an internal passage for the transfer of supply line pressure therethrough;

(c) valve means positioned in said housing adapted to be seated by the triggering mechanism to interrupt the transfer of supply line pressure through said passage; and

(d) means for holding said valve means in a position restricting flow through said passage, which means include a flexible diaphragm which as the result of back pressure created by the flow from the rear face of the piston through a restricted orifice exerts force on said valve means when the control valve is opening.

4,077,603

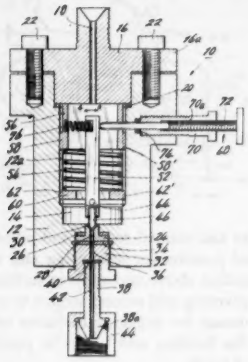
INFINITESIMAL GAS FLOW REGULATOR

Takashi Shimano, Ichihara; Katsumi Orimo, Chiba, and Shoji Yamamoto, Ichihara, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Apr. 22, 1976, Ser. No. 679,504
Int. Cl.[2] F16K *5/10, 31/50*
U.S. Cl. 251—205 **10 Claims**

1. An infinitesimal gas flow regulator comprising: a casing having a primary gas passage provided therein; a valve seat member mounted in said casing and having a valve seat provided at the gas outlet from said primary gas passage, said valve seat member including a secondary gas passage for communicating with said primary gas passage; a valve body disposed in said primary gas passage of said casing and including a hemispheric portion rollingly seated on said valve seat of said valve seat member for pivotal movement of said valve body

about the center of said hemispheric portion of said valve body while said valve body is on said valve seat, said valve body having a notch in said hemispheric portion cooperable with said valve seat for communicating said primary gas passage with said secondary gas passage in said valve seat member in a controllable manner through said notch; and an arm disposed in said primary gas passage of said casing and attached to said



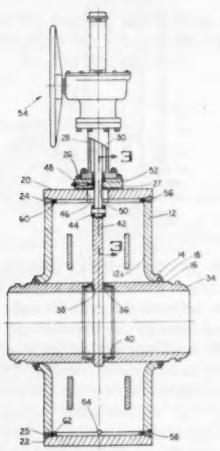
valve body radially of the center of said hemispheric portion of said valve body; and adjusting means engaging the free end of said arm for pivotally moving said arm by the adjustment of said adjusting means for adjusting the pivotal position of said valve body about the center of said hemispheric portion, whereby said notch is opened and closed to a predetermined degree.

4,077,604

CYLINDRICAL GATE VALVE BODY

Marvin G. Combes, Castro Valley, Calif., assignor to Grove Valve and Regulator Company, Oakland, Calif.

Filed Nov. 1, 1976, Ser. No. 737,853
Int. Cl.² F16K *27/04, 27/10, 3/00*
U.S. Cl. 251—329 **3 Claims**



1. A gate valve comprising:

a generally cylindrical tubular body:

a flat, thick, generally circular closure plate having an outer diameter substantially equal to the outer diameter of said body welded to and around the top of said body to resist internal pressures;

a narrow slot in said plate of dimensions adequate to receive closely a valve gate and stem therethrough; and

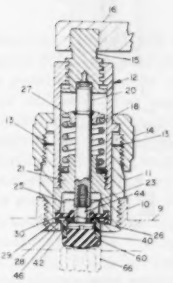
a relatively narrow bonnet plate bolted to said closure plate to cover said slot, said bonnet plate having a through opening therein adapted to slidably receive said valve stem therethrough.

4,077,605

SEALED CARTRIDGE VALVE ASSEMBLY

Hugo Joseph Kutz, deceased, late of Grafton, N. Dak., and by Thomas A. Kutz, executor, 504 Western Ave., Grafton, N. Dak. 58237

Filed Dec. 11, 1975, Ser. No. 639,800
Int. Cl.² F16K *31/00*
U.S. Cl. 251—335 A **4 Claims**



1. A valve cartridge assembly comprising: a generally cylindrical body portion having a base member threaded thereto, a valve stem slideably mounted in and extending through said base member, a threaded operating member rotatably mounted in the upper end of said cylindrical body portion and abutting the upper end of said valve stem, a coil spring surrounding said valve stem having a lower portion engaging said base member and an upper portion engaging a stop member secured to said valve stem and biasing said valve stem upwardly against said operating member,

a collar member on the lower end of said valve stem having an integral centrally disposed sleeve projecting therefrom, a resilient diaphragm member having an inner annular rib defining a central opening telescoped over said sleeve and having an outer peripheral rib sealingly secured to said base member,

a hollow generally cylindrical nonmetallic housing member having a radially inwardly extending base and generally cylindrical side walls, a central opening in said base surrounded by an annular groove portion, said opening in said housing being disposed over said sleeve,

a threaded fastening member having an enlarged head disposed in said housing member and a shank disposed in said collar member and threaded into the lower end of said valve stem with said enlarged head providing a stop shoulder abutting the end of said sleeve and sealingly clamping the diaphragm between said collar member and said housing member,

a resilient sealing member adapted for engagement with a valve seat having an enlarged head of substantially the same diameter as said housing and a cylindrical reduced diameter portion extending in said housing member and frictionally and sealingly engaged therewith, whereby said fastening member within said housing is totally sealed and protected from contact with corrosive liquids,

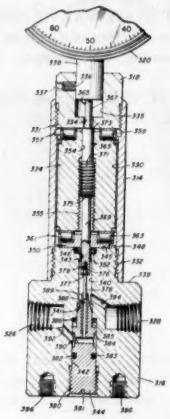
said assembly being operative upon rotation of said operating member to cause said valve stem to move within said cartridge and thereby cause said sealing member secured thereto to move toward and away from said cartridge base member.

4,077,606

FLOW CONTROL VALVE

R. Jules Dussia, Chatham, N.J., assignor to Chatham Precision, Inc., Chatham, N.J.

Division of Ser. No. 131,658, Apr. 6, 1971, Pat. No. 3,765,448.
This application Aug. 27, 1973, Ser. No. 391,740
Int. Cl.[2] F16K 47/04
U.S. Cl. 251—122 2 Claims



1. A flow control valve comprising:

casing means, having a longitudinally extending bore formed in said casing means, and having a longitudinally extending stem disposed for longitudinally axial displacement within said bore;

a fluid flow path formed in said casing means, said fluid flow path including an inlet port, an outlet port, and passage means extending between said inlet port and said outlet port, said fluid flow path being in communication with said longitudinally extending bore and wherein said fluid flow path includes an elongated tube disposed in said bore and defines at least a portion of said passage;

flow control means for controlling the flow of fluid between said inlet port and said outlet port, said flow control means including means for engaging said stem for cooperating with said elongated tube for varying a flow of fluid through said elongated tube wherein said means for engaging said stem comprises a pin extending from the end of said stem, said pin being reciprocable into and out of said tube in response to the axial displacement of said stem and said stem further including a conical bore formed in the end of said stem, said pin extending axially from the base of said conical bore, said conical bore engaging said tube when said pin is fully inserted whereby to displace the tube against the circumferential surface of said pin; and

means for operating said flow control means, said means for operating being an engagement with said flow control means and being contained radially totally within said casing means and accessible to an operator through at least one aperture formed in said casing means.

4,077,607

SERVICING RACK FOR MOTORCYCLES

Grady R. Lovelady, 1625 San Altos Pl., Lemon Grove, Calif. 92045

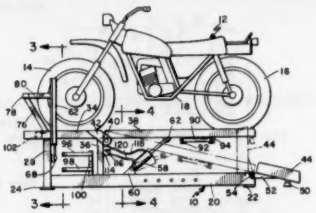
Filed Feb. 23, 1977, Ser. No. 771,197
Int. Cl.[2] B60P 1/16
U.S. Cl. 254—88 13 Claims

1. A servicing rack for in line two wheeled vehicles comprising:

a base for resting on a plane support surface,

a track supported by said base for receiving the wheels of a vehicle,

said track including a first track member horizontally fixed a selected distance above said base, and a second track member pivotally mounted in alignment with one end of said first section, said second section pivoting downward to said support surface to define a ramp from said support



surface to said second section and pivoting upward to a horizontal position for supporting said vehicle in an elevated position above said support surface,

means for pivoting said second section to said positions, and

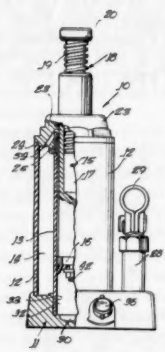
clamping means for engaging the sides of one wheel of a vehicle for holding said wheel in position on said first section of track.

4,077,608

HYDRAULIC HAND JACK

R. Harlan Nehrig, Stevensville, Mich., assignor to Auto Specialties Manufacturing Company, St. Joseph, Mich.

Filed Jan. 5, 1977, Ser. No. 756,893
Int. Cl.[2] B66F 3/24
U.S. Cl. 254—93 H 13 Claims



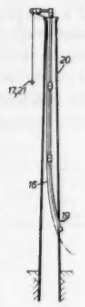
1. In a hydraulic jack comprising a cylinder having two ends and an interior surface, a ram having a head portion reciprocable in the cylinder between the cylinder ends and a rod portion partially extending through one cylinder end to exert a jacking action as the ram head portion moves toward that cylinder end, sealing means carried on the ram head portion to provide a substantially fluid-tight seal between the ram and the cylinder interior surface, the improvement comprising opensided trough means in the interior surface of the cylinder to permit the flow of fluid past the sealing means when the head portion is located substantially adjacent the one cylinder end so as to prevent forcing the ram head and sealing means against the cylinder end and a cylinder cap affixed at said one cylinder end extending from that cylinder end axially along said cylinder over that portion of the cylinder in which said trough means is disposed so as to strengthen that portion of the cylinder.

4,077,609

THREADING DEVICE AND METHOD OF THREADING

John Hartley Trevor Mac Farlane, Hounslow, England, assignor to The Post Office, London, England

Filed Nov. 3, 1976, Ser. No. 738,582
Claims priority, application United Kingdom, Nov. 6, 1975, 46043/75
Int. Cl.[2] B66D *1/36*
U.S. Cl. 254—134.3 FT 26 Claims



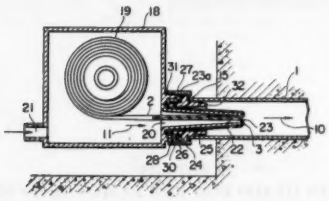
1. A threading device for threading a wire through a hollow upright pole, the device including a guiding and supporting means for guiding and supporting a line and a substantially rigid shaft on an end of which the guiding and supporting means is mounted, the other end of the shaft being hinged to means capable of securing the shaft to a threading rod.

4,077,610

METHOD AND APPARATUS FOR PASSING AN ARTICLE THROUGH AN INTERIOR OF A PIPE

Senichi Masuda, 40-10-605, 1-chome, Hishigahara, Kita, Tokyo, Japan

Continuation of Ser. No. 646,950, Jan. 6, 1976, abandoned. This application Dec. 20, 1976, Ser. No. 752,406
Int. Cl.[2] A61M *25/00*
U.S. Cl. 254—134.4 9 Claims



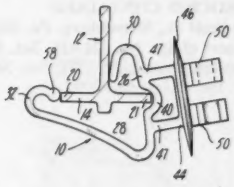
1. The method of inserting a probe into a tube-like opening characterized by the steps of providing an elongated, flexible, fluid impervious, tubular element, folding said element to form an inverted end and inserting the inverted end into the opening, creating a pressure differential across the inverted end of the element such that a sufficiently higher pressure is exerted on said inverted end from the inside of said element to cause said inverted end to travel into the opening pulling said element from its other end into and through said opening, providing an instrument on the exterior of said element at said inverted end and pushing said instrument ahead by the unfolding action of said element as the element expands forwardly.

4,077,611

FENCE WIRE MOUNT AND INSULATOR

Robert M. Wilson, Battle Creek, Mich., assignor to Dare Products, Incorporated, Battle Creek, Mich.

Filed Oct. 26, 1976, Ser. No. 735,140
Int. Cl.[2] A01K *3/00*
U.S. Cl. 256—10 8 Claims



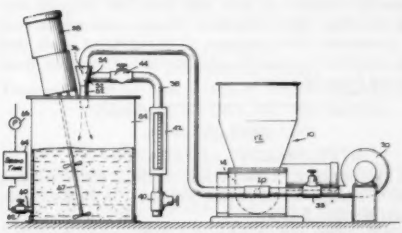
1. An electric fence wire mount and insulator device of plastic material adapted for detachable mounting on a metal fence post having a generally T-shaped cross section with a head member and an intersecting leg member comprising; a V-shaped support bracket with a pair of diverging legs having the apex of said support bracket adapted to be positioned adjacent one edge portion of the head member of a fence post, a first hook element formed at a free end of one leg of said V-shaped bracket for encompassing the other edge portion of said head member, a second hook member formed at the free end of the other of said legs of said V-shaped support bracket for engagement with an edge of the free end of the leg member of said T-shaped cross section, said one leg of said V-shaped support bracket having a curved portion protruding outwardly from said post and forming a recess intermediate the apex and the first hook element, and the spacing from the surface at the end of said second hook member to the botten of said recess is approximately equal to the spacing between the free ends of said head portion for easy insertion of said device on said fence post, a base member supported on said support bracket, and a pair of spaced wire support fingers formed integrally on said base at a side of the latter opposite to said support bracket said V-shaped bracket being adapted for detachable connection to said post with said base supporting an electric fence wire generally horizontally in transverse and electrically insulated relationship to said post.

4,077,612

METERING AND WETTING SYSTEM

Ronald J. Ricciardi, 108 Malcolm Ave., Garfield, N.J. 07026

Continuation-in-part of Ser. No. 421,668, Dec. 4, 1973, abandoned. This application Oct. 7, 1976, Ser. No. 730,326
Int. Cl.[2] B01D *47/00*; B67D *5/54*; B01F *15/00*
U.S. Cl. 366—102 24 Claims



1. A metering and wetting system for polyelectrolyte or the like comprising, in combination, volumetric feeder means for receiving powdered polyelectrolyte and conditioning and metering same, means for supplying a controlled quantity of compressed air, an air dryer assembly for predrying said compressed air, means for atomizing said powdered polyelectrolyte from said feeder means with said compressed air, means

for supplying a controlled quantity of water, a mixing-wetting chamber for receiving said atomized powdered polyelectrolyte and said controlled quantity of water and wetting substantially all of the atomized particles of polyelectrolyte, and a mixing tank for receiving said so wetted polyelectrolyte and aging same.

4,077,613

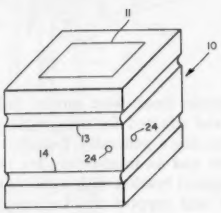
PROCESS CONTAINER

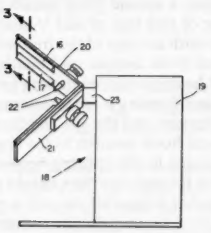
William Wilson, 716 Scott St., Stroudsburg, Pa. 18360

Continuation-in-part of Ser. No. 321,436, Jan. 5, 1973, abandoned. This application Aug. 29, 1975, Ser. No. 608,945

Int. Cl.[2] B01F *9/00*

U.S. Cl. 366—213 **12 Claims**





1. Apparatus for handling material comprising; at least one containing member, said containing member comprising a plurality of sides, each of said sides having a predetermined transverse dimension, means for interconnecting at least two adjacent sides so that they are disposed at a predetermined angle with respect to each other, each of said two adjacent sides including elongated transversely extending fitting means; two elongated arms; means for supporting said arms at said predetermined angle so that said arms can lie along said adjacent sides without regard to the transverse dimensions of said sides; elongated fitting means supported by and extending along said arms, said last named fitting means being receivable into complementary engagement with said fitting means on said containing member so that said arms can support said containing member; and retractable means mounted on said arms for movement into and out of engagement with said containing member to restrain said containing member from moving away from said arms.

4,077,614

STEELMAKING APPARATUS

Isao Udo, Nishinomiya; Tatsuya Kai, Himeji, and Masahiro Kuwashiro, Hyogo, all of Japan, assignors to Toshin Seiko Kabushiki Kaisha, Japan

Division of Ser. No. 614,334, Sep. 17, 1975, abandoned. This application Nov. 10, 1976, Ser. No. 742,137

Int. Cl.[2] C21C *7/00*

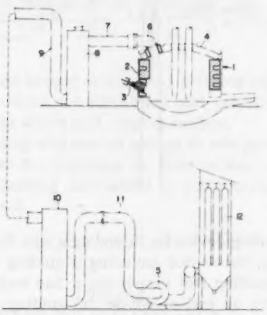
U.S. Cl. 266—159 **7 Claims**

1. Steelmaking apparatus comprising an arc furnace having arc generating electrodes for producing ordinary steels and alloy steels from cold charges of steel scrap as raw material and fume evacuation means for drawing exhaust fumes out of the furnace and simultaneously creating a negative pressure therein during the operation thereof, the arc furnace comprising:

a furnace wall formed of carbonaceous brick upward from a level slightly above a slag line within the furnace and cooled by water-cooled boxes imbeddedly sandwiched between the carbonaceous bricks;

a furnace roof having an outer peripheral part made of steel-cased, magnesite-chrome bricks, a central part around electrode insertion holes provided with high-alumina ramming mass, and a part around a fume exhaust hole provided with a water-cooled ring and a high-alumina ramming mass disposed therearond; and

a plurality of oxygen — fuel oil burners each mounted in inserted state at a specific angle in the furnace wall



through an opening therein provided with water-cooling means, the part of the furnace wall around each water-cooling means being provided with burner tiles, each of the burners being constructed to eject a stream of a mixture of air and fuel oil atomized therein from a flame emitting end of a burner cylinder and to eject a large quantity of oxygen in the form of a high-velocity convergent stream encompassing the stream of the mixture until the oxygen stream converges at an intersection with the mixture stream at a point which is a certain distance downstream from the burner thus becoming a long-focus stream, the burners thereby operating to cut melt directly the steel scrap and, simultaneously, to combust the combustibles which have been charged into the furnace together with the steel scrap.

4,077,615

SUCTION HEADS FOR THE REMOVAL OF SCUM

Katsumi Nagasaki, Osaka; Yoshihiro Inoue, Nishinomiya; Hiroyuki Yamazaki, Amagasaki; Akifumi Yano, and Tetsuo Momose, both of Osaka, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Jun. 2, 1977, Ser. No. 802,656

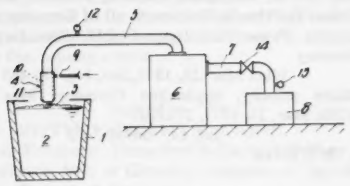
Claims priority, application Japan, Jun. 11, 1976, 51-69235

Int. Cl.[2] C21C *7/00*

U.S. Cl. 266—201 **11 Claims**

1. In a suction head for removing scum from the surface of a molten metal or the like including a suction pipe having a scum inlet, a water cooling jacket provided around the suction pipe and positioned at least close to the scum inlet, and water injecting means for injecting water in the jacket into the suction pipe close to the scum inlet, the improvement comprising:

the water injecting means including a first nozzle for forcing out water toward the axis of the suction pipe, and a second



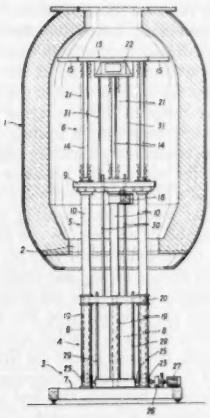
nozzle for forcing out water along the inner peripheral surface of the suction pipe.

4,077,616

METALLURGICAL VESSEL LINING ARRANGEMENT

Hellmuth Smejkal; Otto Hiris, both of Linz, and Helmut Mayrandl, Steyr, all of Austria, assignors to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft, Linz, Austria

Filed Jun. 7, 1976, Ser. No. 694,154
Claims priority, application Austria, Jun. 10, 1975, 4392/75
Int. Cl.[2] C21C *5/42*
U.S. Cl. 266—281 **6 Claims**



1. A liftable and lowerable arrangement for lining metallurgical vessels, in particular converters, including

a first upper tube element;

a second lower tube element; and

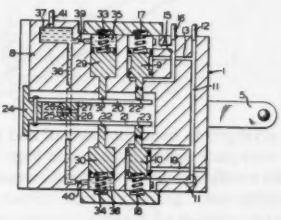
a third middle tube element between the first and second tube elements, each tube element comprising a frame member and at least three vertical tube pieces located at the periphery of the tube element, the frame member of said first element being a working platform of the arrangement, the upper end of each vertical tube piece being connected with its respective frame member, the tube pieces of the first and second tube elements being telescopically movable into the tube pieces of the third tube element.

4,077,617

VEHICLE LEVELING VALVE DEVICE WITH DAMPENING ARRANGEMENT

Raymond C. Wright, Irwin, Pa., assignor to Westinghouse Air Brake Company, Wilmerding, Pa.

Filed Jun. 3, 1976, Ser. No. 692,597
Int. Cl.[2] F16F *5/00*
U.S. Cl. 267—65 D **8 Claims**



1. A leveling valve device interposable between a sprung portion and an unsprung portion of a vehicle and operable responsively to relative movement therebetween resulting from variation in vehicle load for accordingly effecting increase or decrease of air pressure in an air spring for maintaining a normal relative height between the sprung and unsprung portions, said leveling valve device comprising:

(a) a casing;

(b) valve means disposed in said casing and operable to a supply position, in which air pressure is supplied to the air spring, and to an exhaust position in which air pressure is released from the air spring;

(c) operating means connected to said valve means and movable in one direction, by relative movement between the sprung and unsprung portions in said one direction at a certain rate, to a first operating position for effecting operation of said valve means to said supply position, and movable in an opposite direction relative to said one direction, by relative movement between the sprung and unsprung portions of the vehicle in said opposite direction at said certain rate, to a second operating position for effecting operation of said valve means to said exhaust position; and

(d) dampening means operably interposed between said valve means and said operating means and being yieldable to movement of said operating means in either said one or said opposite directions, when said movement occurs at said certain rate or less, for transmitting such movement to and effecting operation of said valve means accordingly, and for dampening said movement of said operating means occurring at a rate in excess of said certain rate for inhibiting transmission thereof to said valve means.

4,077,618

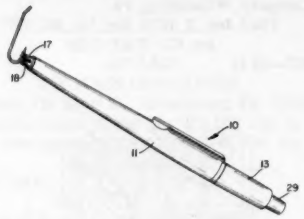
PORTABLE VISE

Thomas O. Durant, Rte. 2, Box 49, Mount Pleasant, S.C. 29464

Filed Mar. 24, 1977, Ser. No. 780,973
Int. Cl.[2] B25B *1/20*
U.S. Cl. 269—130 **4 Claims**

1. A portable vise comprising an elongated hollow housing having an open end and a fixed surface at said open end, means within the housing movably mounting a workpiece clamping element at said open end, said clamping element being adapted to be projected through said open end and being formed to receive a workpiece, and resilient means within the housing biasing said clamping element toward the interior of said housing whereby a workpiece received by said clamping element will be resiliently clamped against said fixed body surface, said resilient means being effective to retract said clamping element substantially within said housing in the absence of a workpiece said clamping element being an effective loop, said body open

end being formed with circumferentially spaced axially open longitudinal slots and said effective loop being composed of wire having a diameter smaller than the width of said slots, said



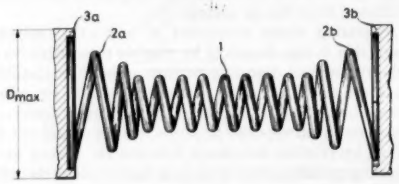
slots being arranged to house portions of said loop in the absence of a workpiece and to engage said loop portions in the presence of a workpiece to thereby firmly mount a workpiece on said portable vise.

4,077,619

HELICAL COMPRESSION SPRING MADE OF WIRE OF CIRCULAR CROSS SECTION, ESPECIALLY FOR USE IN MOTOR VEHICLES

Arthur Borlinghaus, Berghausen, Germany, assignor to Firma Gebruder Ahle, Karlsthal, Germany

Filed Feb. 10, 1976, Ser. No. 656,904
Claims priority, application Germany, Feb. 15, 1975, 2506420
Int. Cl.² F16F 1/06
U.S. Cl. 267—166 **5 Claims**



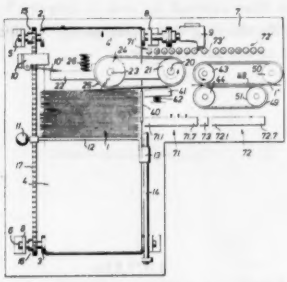
1. A helical compression spring having a partially progressive characteristic, said spring comprising a first truncoconical spring portion whose coil of largest diameter is positioned at the extremity of the spring and a cylindrical spring portion, said first truncoconical spring portion having an inconstant wire diameter, the coils of said first truncoconical spring portion having the largest wire diameter disposed between regions of said first truncoconical spring portion of lesser wire diameter, one of said regions of lesser wire diameter working toward the extremity of said spring, the other of said regions joined integrally and coterminously with the cylindrical spring portion having a constant wire thickness, the coils of said first truncoconical spring portion being disposed in said spring such that at maximum load said coils lie inside one another in the form of a spiral and wherein there is integrally and coterminously disposed on said cylindrical spring portion at its end opposed to said first truncoconical spring portion, a second truncoconical spring portion, said second truncoconical spring portion having its end of largest diameter disposed at its extremity away from said cylindrical spring portion, said second truncoconical spring portion being a spring of inconstant wire diameter, the coils of said second truncoconical spring portion of largest wire diameter being disposed between regions of said second truncoconical spring portion of lesser diameter, one of said regions of lesser wire diameter reaching toward the extremity of said spring, the other of said regions joining integrally and coterminously said cylindrical spring portion of constant wire diameter.

4,077,620

APPARATUS FOR THE SUCCESSIVE RELEASE OF ITEMS OF MAIL FROM A STACK

Werner Frank, Reichenau; Henning Jeschke, Konstanz, and Gisbert Burkhardt, Reichenau, all of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Germany

Filed Mar. 25, 1977, Ser. No. 781,467
Claims priority, application Germany, Mar. 27, 1976, 2613261; Mar. 24, 1977, 2712907
Int. Cl.² B65H 7/02
U.S. Cl. 271—10 **14 Claims**



1. In apparatus for the successive discharge and conveyance, along a conveying path, of separated items of mail from a stack of such items, which apparatus includes: means defining a stack region for containing such a stack of items and presenting a stack outlet for the discharge of items from one end of the stack; continuously driven conveying means spaced from the stack outlet and defining a portion of the conveying path, the conveying means having an effective range and conveying each item entering the effective range along such portion of the conveying path; removal means disposed between the stack region and the conveying means to define an initial portion of the conveying path and controllably operable for conveying successive items from the one end of the stack, through the stack outlet, along the initial portion of the conveying path and into the effective range of the conveying means, with a first edge of each item constituting a leading edge and a second edge of each item constituting a trailing edge; first item sensing means disposed for sensing the presence of an item of the conveying path at a location between the stack outlet and the conveying means; second item sensing means disposed for sensing the presence of an item on the conveying path at a location spaced from, and downstream of, the location associated with the first sensing means; and control means connected to respond to output signals from the sensing means and connected to control the operation of the removal means for causing the removal means to establish a desired spacing, along the conveying path, between one of the first and second edges of each item and the immediately following item which corresponds to the spacing between the first and second sensing means, the improvement wherein: each of said sensing means is arranged for monitoring an item along an associated measuring path along the conveying path, the measuring path of said first sensing means extending from said stack outlet and the measuring path of said second sensing means being offset from the measuring path of said first sensing means by a distance corresponding to the desired spacing; said first sensing means comprises means for producing an output signal representative of the distance which has been traversed by the leading edge of an item along the measuring path of said first sensing means; said second sensing means comprises means for producing an output signal representative of the distance which has been traversed by the one of the first and second edges of an item along the measuring path of said second sensing means; and said control means are arranged for responding to the output signals produced by said producing means for causing said

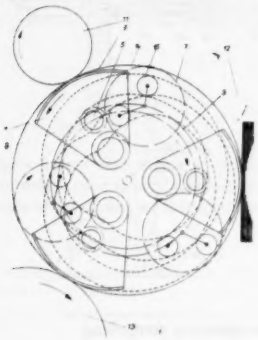
removal means to begin conveying an item present on the initial portion of the conveying path upon production of output signals indicating that the distance traversed by the one of the edges of an item along the measuring path of said second sensing means is equal to the distance traversed by the leading edge of the immediately following item along the measuring path of said first sensing means.

4,077,621

BOTTLE LABELING MACHINE

Heinz-Werner Knuppertz, Dusseldorf-Reisholz, and Hans Lederer, Meerbusch, both of Germany, assignors to Jagenberg-Werke AG, Dusseldorf, Germany

Continuation of Ser. No. 597,277, Jul. 18, 1975, abandoned.
This application Jan. 17, 1977, Ser. No. 760,210
Claims priority, application Germany, Jul. 26, 1974, 24360030
Int. Cl.[2] B65C *9/16;* B65H *3/20*
U.S. Cl. 271—33 **5 Claims**



1. In an apparatus of the type having a fixed support having a central axis, a gluing station, a label magazine station and a label transfer station each spaced apart and having a contact surface disposable at a given radial distance from the central axis, the improvement which comprises: a support rotatable with respect to said fixed support about said central axis; at least one pickup element having one arcuate contacting surface and mounted on said rotatable support for rotation about a given axis parallel to said central axis to dispose successive portions of the arcuate contacting surface at said given radial distance from said central axis, and means responsive to the rotation of said rotatable support for effecting one complete rotation of each pickup element successively for each station during one revolution of said rotatable support to produce a successive rolling contact of the arcuate contacting surface with each of the contact surfaces of the stations, said means including at least two intersecting closed cam tracks in said fixed support disposed around said central axis and at least two cam followers associated with each pickup element and each disposed in a different cam track to rotatably drive the associated pickup element as the cam followers travel in the cam tracks when the rotatable support is rotated.

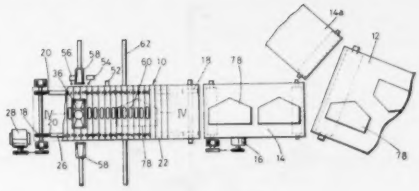
4,077,622

APPARATUS AND METHOD FOR TRANSFERRING SOFT PANELS FROM CONVEYING SURFACE

Mitsuru Bando, Odawara, and Shun Aoki, Kanagawa, both of Japan, assignors to Kubota, Ltd., Osaka, Japan

Filed Dec. 13, 1976, Ser. No. 749,898
Claims priority, application Japan, Dec. 12, 1975, 50-148592
Int. Cl.[2] B65H *29/68*
U.S. Cl. 271—183 **5 Claims**

1. An apparatus for transferring soft panesl from a conveying surface while the panels are being conveyed on the surface, the apparatus comprising endless conveyor means for conveying the soft panels, the conveyor means being formed with slit-like dropping openings extending therethrough from its front conveying surface to the rear surface thereof and permitting the passage of the soft panel therethrough, a carrier disposed below the conveyor means and having a table and lifting means for lowering the table in accordacne with the height of the panesl to be stacked thereon, and suction means disposed



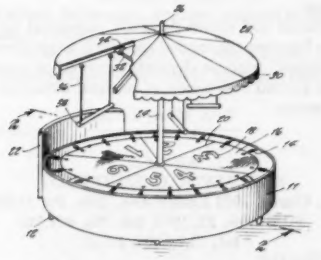
above the conveying surface in opposed relation to the carrier and having a suction opening facing the conveying surface with downward projecting means for stopping the progression of said panels disposed on the downstream side of said suction opening and valve means for effecting suction in switching manner.

4,077,623

EXERCISING GAME APPARATUS

Joseph Clausell, 27-86 Dewey Ave., Apt. 6B, Bronx, N.Y. 10465

Filed Jul. 19, 1976, Ser. No. 706,265
Int. Cl.[2] A63B *5/08, 7/02*
U.S. Cl. 272—61 **11 Claims**



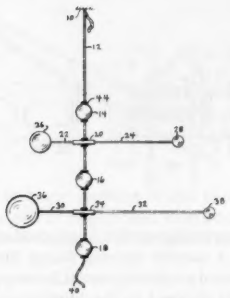
1. An exercising game apparatus comprising a frame, a flexible sheet, a column, said flexible sheet being supported by said frame, means to maintain the peripheral edges of said flexible sheet taut by having said peripheral edges of said sheet urged outwardly from the central regions of said flexible sheet, said flexible sheet having an opening therein, said column being disposed in a vertical position having a portion thereof passing through said opening, means to fasten said column to said frame, a superstructure, said superstructure being fastened adjacent the uppermost end of said column, a plurality of trapezes, said plurality of trapezes being supported by said superstructure and depending downwardly therefrom, a cable, one end of said cable fixedly secured to said flexible sheet at a location adjacent said opening therein, means to removably secure a portion of said cable to said frame, said flexible sheet being urged into a truncated conical shape when said cable is pulled downwardly from a plane defining the surface of said flexible sheet when in a planer condition, said plurality of trapezes residing in an area defined by said peripheral edges.

4,077,624

STRIKING DEVICE FOR TRAINING IN MARTIAL ARTS

David D. Feaser, Rte. 1, Box 69, Shepherdstown, W. Va. 25543

Filed Oct. 18, 1976, Ser. No. 733,468
Int. Cl.[2] A63B *69/22*
U.S. Cl. 272—76 12 Claims



1. A striking device for use by a trainee in the martial arts comprising:

(A) cord means,

(B) means for affixing the cord means near one end thereof to a support,

(C) first and second target elements supported by the cord means at different distances from the support, the second target element being further from the support than the first target element,

(D) first rod means centrally supported by the cord means between the first and second target elements,

(E) response elements mounted on opposite ends of the first rod means, at unequal distances from the cord means,

(F) a third target element supported by the cord means at a greater distance from the support than is the second target element,

(G) a second rod means centrally supported by the cord means between the second and third target elements, and

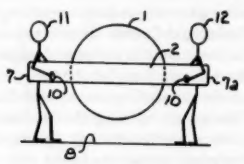
(H) additional response elements mounted on opposite ends of the second rod means at unequal distances from the cord means.

4,077,625

PNEUMATIC CUSHION TOY

William A. Clarke, 1001 Linden Ave., Erie, Pa. 16505

Filed Mar. 22, 1976, Ser. No. 669,316
Int. Cl.[2] A63B *21/28*
U.S. Cl. 272—116 2 Claims



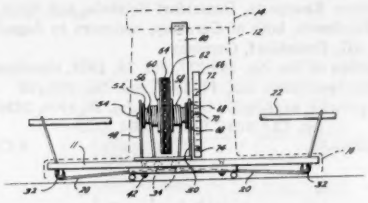
1. A large hollow inflatable pneumatic cushion of air impervious material having a loop of wide flattened flexible material joined to opposite sides thereof, each loop having a pair of hand holds therein, each loop being of a size to receive the waist of a player, so that a pair of players each standing in a respective loop and each facing the cushion and holding the hand holds so as to confine themselves between the cushion and the loop around their back at waist height may dance about and push and pull and bump each other without direct bodily contact.

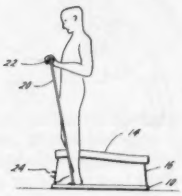
4,077,626

EXERCISING MACHINE

Joe Westley Newman, 1521 E. Deerwood Dr., Mobile, Ala. 36618

Filed Nov. 13, 1974, Ser. No. 523,458
The portion of the term of this patent subsequent to Dec. 10, 1995, has been disclaimed.
Int. Cl.[2] A63B *21/02*
U.S. Cl. 272—128 16 Claims





1. An exercise apparatus comprising

a platform,

a bench on said platform positioned to provide a foot space on said platform on each side of said bench,

a pair of stanchions positioned apart on said platform;

a flywheel rotateably mounted between said stanchions;

linear to rotational motion conversion means for converting linear motion to rotational motion adapted to impart said rotational motion to said flywheel;

a pair of lines operably attached to said linear to rotational motion means and leading to either side of said bench, and

a bar transversing said bench and attached to said lines.

4,077,627

TENNIS RACKET WITH DETACHABLE HANDLE

Guy R. Cheatham, 1520 Man O War Dr., Floressant, Mo. 63033, and Ralph W. Fisher, 619 Riverview La., St. Charles, Mo. 63301

Filed May 19, 1976, Ser. No. 688,096
Int. Cl.[2] A63B *49/02*
U.S. Cl. 273—73 R 5 Claims

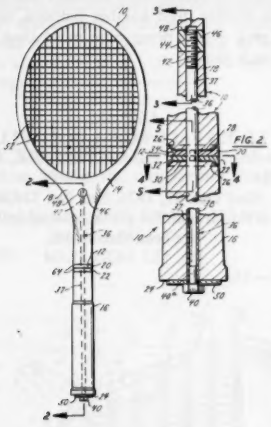
1. A racket having a head portion which includes a throat with a fastener abutment surface therein, a handle portion and means to detachably connect said head portion and said handle portions together, said means including:

a first butt plate having an abutment surface connected to said head portion;

a second butt plate having an abutment surface connected to said handle portion, said second butt plate abutment surface being positioned to face and abut said abutment surface of said first butt plate when said portions are connected; and

means to force said abutment surfaces together including a tension rod which extends through at least part of said head and handle portions, said rod having a threaded portion and a head portion for the application of torque and to provide means to establish tension thereacross, abutment means to engage said rod head portion connected to said handle portion, and threaded attachment

means connected to said head portion of said racket to engage said threaded portion of said rod, said threaded attachment means including a fastener which extends



transversely across said throat to engage said fastener abutment surface over an area substantially larger than the surface area of the connected threaded portion of said rod.

4,077,628

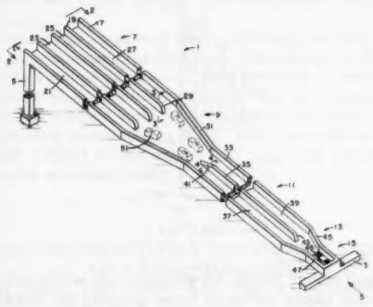
RACE TRACK GAME

Frederick G. Hebert, 14 Oak Terrace, Caselton, N.Y. 12033

Filed Dec. 6, 1976, Ser. No. 748,239

Int. Cl.² A63F *9/14*

U.S. Cl. 273—86 C **9 Claims**



1. A race track game for toy racing vehicles having a downwardly-sloped raceway comprising a first multiple-lane starting section for said vehicles, a second, open-area, funnel-shaped section, a third multiple-lane section having fewer lanes than said first multiple-lane section, a fourth, open-area, funnel-shaped section and a fifth victory section, said second funnel-shaped section converging said raceway from said first multiple-lane section to said third multiple-lane section and said fourth funnel-shaped section converging said raceway from said third multiple-lane section to said fifth victory section.

4,077,629

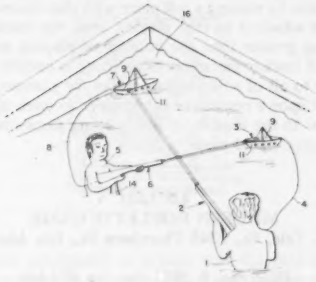
SEA BATTLE GAME APPARATUS

James K. Chestney, Alton, Ill., assignor to Lawrence Peska Associates, Inc., New York, N.Y.

Filed Jan. 31, 1977, Ser. No. 764,224

Int. Cl.² A63B *67/00*

U.S. Cl. 273—101 **3 Claims**



1. A water game for at least two players wherein each player is equipped with:

(a) a gun, a tether line attached to both said gun and a ship;

(b) said ship including means for directing water shot from a gun held by an opposing player into a hull thereof which sinks in water upon being filled with water;

(c) said gun including trigger means, means for pumping water from a body of water in which a player is positioned and actuable in response to operation of said trigger means, and nozzle means for directing water from said gun to an opponent's ship.

4,077,630

BOARD GAME

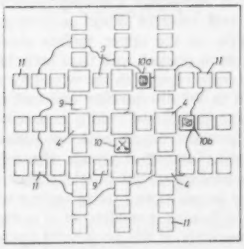
Michael Kindred, Bilborough, England, assignor to Invicta Plastics Limited, Leicester, England

Filed Dec. 15, 1976, Ser. No. 750,854

Claims priority, application United Kingdom, Dec. 23, 1975, 52688/75

Int. Cl.² A63F *3/00*

U.S. Cl. 273—273 **5 Claims**



1. In a board game for two players comprising a game board bearing a plurality of rows of playing areas positioned in a regular grid arrangement, a plurality of shield pieces corresponding in number to the number of playing areas, a plurality of playing pieces receivable in said shield pieces adapted to be concealed from one of the players by said shield pieces while remaining visible to the other player, the playing pieces corresponding in number to the number of playing areas, said playing pieces each displaying one of a plurality of contrasting characteristics, only one of said pieces bearing a preselected one of said characteristics, the location of at least said one only piece of said playing pieces when concealed by a respective

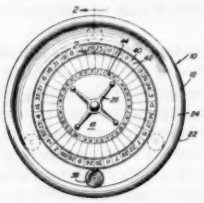
shield piece being the task of said one player, a number of test pieces bearing characteristics corresponding to said playing pieces with the exception of said preselected one only playing piece, said game board having a plurality of test areas having different identifying characteristics from said playing areas, said test areas each disposed between a pair of adjacent ones of said playing areas in said regular grid to enable said one player to test for the presence of a playing piece having a particular characteristic by placing a test piece with that characteristic on a test area adjacent to that playing area, the number of test areas being greater than the number of playing areas, and a plurality of marker pieces corresponding in number and characteristics to all of said playing pieces for placement by said one player upon a respective shield piece to mark his reasoned selection as to the identity of that playing piece concealed by the respective shield piece.

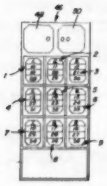
4,077,631

MODERN ROULETTE GAME

Charles T. Tela, Sr., 5348 Thornburn St., Los Angeles, Calif. 90045

Filed Jun. 9, 1976, Ser. No. 694,461
Int. Cl.² A63F 5/00
U.S. Cl. 273—142 E **3 Claims**





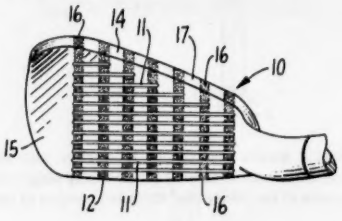
1. A modern roulette game comprising the combination of a stationary base of dish-shape rotatably supporting a roulette wheel therein, said roulette wheel including a plurality of peripheral pockets on the upper surface thereof, a numeral associated with each pocket, said base including a peripheral inclined surface concentric with the wheel for receiving a ball rollably thereon in which the ball will roll into one of the pockets when the ball slows, and a layout of the numerals identifying the pockets on an adjacent planar surface, said layout including a plurality of groups of numerals with each group having a predetermined equal number of numerals on which chips may be positioned when betting which numbered pocket the ball will enter, a smaller set of numerals positioned on the wheel inwardly of the peripheral numerals with each numeral of the smaller set in radial alignment with a respective peripheral numeral with the smaller group of numerals indicating the group of numerals on the layout to which its aligned numeral on the outer periphery of the wheel belongs, the numerals on the outer periphery of the wheel including 0, 00 and 1–36, inclusive, said groups of numerals on the layout including numerals 1–36 divided into nine groups of four numerals each with numerals 1–9 indicating the nine groups and being the uppermost lead numeral in each group, the smaller set of numerals on the roulette wheel inwardly of the periphery thereof including four sets of numerals 1–9, and one each of 0 and 00, said numerals being associated with distinguishable colors with the numerals 1–36 including one-half of the numerals being red and the other one-half being black, the first group of numerals on the layout including two red numerals and two black numerals, four of the groups including all black numerals and four of the groups including all red numerals, the addition of the two digits of double digit numbers indicating the group to which the double digit number belongs, each subsequent numeral in each group being nine more than the preceding numeral in each group.

4,077,632

LINED FACE FOR A GOLF CLUB

David L. Taylor, 380 W. Carmel Valley Rd., Carmel Valley, Calif. 93924

Filed Oct. 27, 1976, Ser. No. 736,065
The portion of the term of this patent subsequent to Sep. 7, 1990, has been disclaimed.
Int. Cl.² A63B 53/04
U.S. Cl. 273—164 **4 Claims**



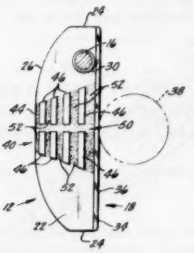
1. A head for a golf club having a striking face and a top surface, spaced vertical stripes over more than one-half of the area of said striking face, said stripes continuing contiguously across the top surface of said head.

4,077,633

GOLF PUTTER

George Studen, 17040 San Bruno, No. 4, Fountain Valley, Calif. 92708

Filed May 26, 1976, Ser. No. 689,000
Int. Cl.² A63B 53/04
U.S. Cl. 273—164 **3 Claims**



3. A golf club or the like for striking a ball, which comprises:
(a) a club handle having an upper gripping end and a lower mounting end, and
(b) a club head having top, bottom and rear surfaces and a front, ball engaging face and including means for attaching the mounting end of the club handle to the club head,
said club head including means for defining a plurality of first lines of contrasting appearance on the top surface generally parallel to the front face, said defining means also defining a second line of contrasting appearance in a plane orthogonal to the front face and bottom surface and through the center of a preferential ball striking region, said second line pointing towards said center in a manner

readily visible to a user holding the club in a normal, ball striking manner,

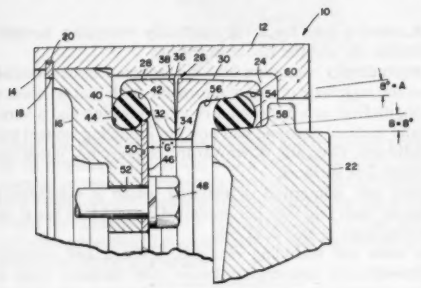
the first contrasting line defining means including means for forming alternating elevated and recessed regions parallel to the head face, said elevated regions being interrupted to define said second line of contrasting appearance, said recessed and interrupted regions being at least partially filled with a material with high visual contrast with the elevated regions.

4,077,634

PRESSURE BALANCED METAL TO METAL SEAL

Donald F. Durham, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 13, 1976, Ser. No. 722,445
Int. Cl.[2] F16J *15/38*
U.S. Cl. 277—92 **7 Claims**



1. In combination with a pair of relatively rotatable members, a seal assembly comprising:

a pair of seal rings having means defining axially disposed seal faces disposed on each of said rings,

each of said seal faces having means defining a narrow seal band thereon,

first mounting means securing one of said rings to one of said members,

second mounting means securing the other of said rings to the other of said members,

one of said mounting means including loading means for applying a face load to said seal rings,

said loading means including a pair of opposed conical ramps and a first resilient toric compressed between the ramps,

the other of said mounting means including a second resilient toric compressed between an annular groove in the other of said members, and a retainer opposite to said annular groove so as to prevent relative axial movement of said second resilient toric with respect to the other of said mounting means and wherein said ramps define angles with respect to the axis of said rings and wherein said angles are substantially 8°.

4,077,635

DEVICE FOR SELECTIVELY POSITIONING THE ARM OF A RECORD PLAYER

Eugene Valere, 1266 Rogers Ave., Apt. #1, Brooklyn, N.Y. 11226

Filed Sep. 27, 1976, Ser. No. 726,665
Int. Cl.[2] G11B *3/10*
U.S. Cl. 274—23 R **6 Claims**

1. In a record player of the type having a base, a turntable and a positionable tone arm pivotally mounted at one end for movement in a plane parallel to the base and for movement in a plane perpendicular to the base, wherein the improvement comprises: a device for selectively positioning the tone arm in a desired position along the radius of a record to be played to permit the repeatable placement of the tone arm on the record on a portion between the beginning and the end thereof, said device comprising a first member connected to said one end of the tone arm and extending outwardly therefrom along the longitudinal axis of the tone arm, a boss fixedly secured to and extending upwardly from said base, an elongated stop member, said stop member having an end pivotally secured to said boss, and a side of said stop member adjacent the free end of said

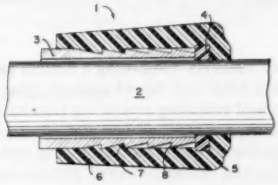
stop member configured to engage with the first member to stop movement of the tone arm only when the tone arm is both lifted and moved along the record towards the center thereof and means pivotally mounting an end of said stop member to said boss above said base for movement in a plane parallel to said base to enable the selective adjustment of the stop member to stop the tone arm at a desired position.

4,077,636

SELF-ALIGNING CABLE ROD SEAL

William D. Langford, Stow, Ohio, assignor to Incom International, Inc., Pittsburgh, Pa.

Filed Apr. 18, 1977, Ser. No. 788,527
Int. Cl.[2] F16C *1/28;* **B65D** *53/02*
U.S. Cl. 277—117 **10 Claims**



1. A self-aligning cable rod seal adapted to be mounted on a cable conduit having a cable rod slidably positioned therein comprising a relatively rigid ring bearing adapted for close contact with the rod disposed therein, and a resilient seal having an end wall axially overlying said ring bearing and axially restrained to prevent axial movement of the ring bearing, said wall having an axial bore aligned with the ring bearing and adapted for close contact with the rod disposed therein.

4,077,637

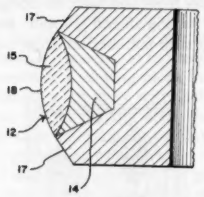
CERAMIC COATED PISTON RINGS

Glenn F. Hyde, Timonium, and Thomas W. Alban, Glen Burnie, both of Md., assignors to Koppers Company, Inc., Pittsburgh, Pa.

Filed Jan. 17, 1977, Ser. No. 759,841
Int. Cl.[2] B05B *7/22;* **F16J** *9/00*
U.S. Cl. 277—235 A **4 Claims**

1. A piston ring having a scuff and wear resistant coating

comprised of 91–95 percent aluminum oxide, 0–5 percent titanium dioxide and 0–4 percent ferric oxide by weight, said scuff



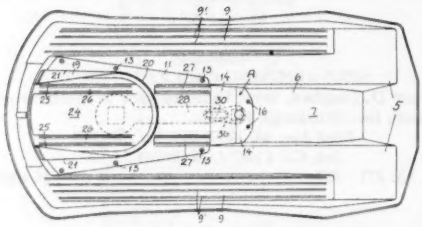
and wear resistant coating being plasma sprayed on said piston ring.

4,077,638

ARRANGEMENT IN STEERABLE SLIDE-TRAYS

Olav Gerhard Lund, Hovinveien 9B, Oslo 5, Norway

Filed Mar. 19, 1976, Ser. No. 668,740
Claims priority, application Norway, Apr. 2, 1975, 751129
Int. Cl.² B62B *13/10*
U.S. Cl. 280—21 R **4 Claims**



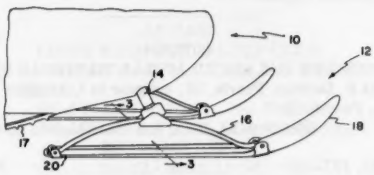
1. A steerable slide-tray comprising a bottom part having a seating portion, a front part curved upwards from the bottom part, and a side wall extending around the remaining periphery of the bottom part, a channel-shaped portion extending longitudinally of the bottom part and extending upwardly with respect thereto, said channel-shaped portion comprising a rearward, laterally widened portion of a channel having an upper wall and side walls extending along the whole length of said bottom part, said upper channel wall having an elevated angular portion with an inclined part in which there is provided an opening, a support plate releasably secured in said channel shaped portion comprising a rearward plate portion corresponding to said widened channel portion and secured to the side walls thereof on a level with said bottom part, and a forward plate portion having a width corresponding to the width of said channel and of which a first part is parallel to said inclined part of said angular portion of said upper channel wall and a second part of which is an end part on a level with said upper wall and is secured thereto at said angular portion, a recess provided in said rearward support plate portion extending upwardly with respect to said bottom part, a rotatable steering member received in said recess and provided with steering ribs, a steering wheel located in front of said seating portion, and a connecting mechanism for operatively connecting said steering member to said steering wheel, said steering member together with said connecting mechanism and steering wheel being mounted on said support plate with said steering wheel being mounted in said opening in said inclined part of said upper channel wall.

4,077,639

SNOWMOBILE SKI KEEL

Donald Reedy, West Branch, Mich., assignor to Special Sports Products Corporation, West Branch, Mich.

Filed Jan. 23, 1976, Ser. No. 651,979
Int. Cl.² B62M *27/02*
U.S. Cl. 280—28 **5 Claims**



1. A steering keel for a longitudinally extending, turnable snowmobile ski and the like comprising:

a longitudinally extending host bar, adapted to be mounted on the underside of said ski, turnable with said ski about a longitudinal axis between a running position and a vertically inclined position; said host bar including inboard and outboard, elongate, downwardly converging, upper opposite side surfaces;

a wear rail, comprised of material which is substantially harder than said host bar, mounted on said host bar at the lower edge of said host bar;

said wear rail including elongate, inboard and outboard downwardly converging lower side surfaces lying in downwardly converging planes, said lower side surfaces terminating in an elongate, ice penetrating edge lying in a vertical plane;

said lower side surfaces extending downwardly beyond the bottom of said host bar and being aligned with said upper side surfaces of said host bar to inhibit drag and enhance penetration of said wear rail into said surface being traversed;

said inboard and outboard lower side surfaces lying in the planes of said inboard and outboard upper side surfaces respectively;

said downwardly converging planes intersecting said edge; and

means for mounting said steering keel on said ski such that

said upper and lower inboard surfaces lie on the inboard side of said vertical plane when said host bar is in said running position and when said host bar is in said vertically inclined position, and

said upper and lower outboard side surfaces are disposed in a position interjacent said vertical plane and the inboard side of said vertical plane when said keel is in said inclined position.

4,077,640

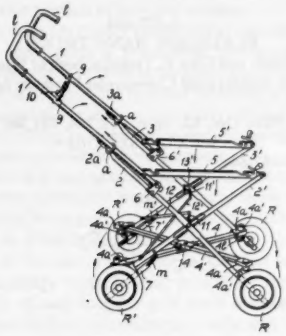
PERAMBULATOR FOLDABLE SUPPORT FRAME

Giuseppe Perego, Via De Gasperi, Arcore (Milan), Italy (20043)

Filed Nov. 15, 1976, Ser. No. 741,934
Claims priority, application Italy, May 24, 1976, 23556/76
Int. Cl.² B62B *11/00*
U.S. Cl. 280—42 **6 Claims**

1. A foldable frame support for a perambulator comprising; a pair of opposed side cross-struts, each of said cross-struts including a front leg and a rear leg of said frame, pivot means interconnecting said rear leg and corresponding front leg intermediate the ends thereof, an arm member pivotally connected to the upper end portion of the respective front legs, a wheel journaled on the lower end portion of the respective front and rear legs, a base cross-strut including crossing arm struts pivoted together intermediate the ends thereof, means for pivoting the opposed ends of the respective arm struts of said base cross-strut to the lower end portion of diagonally

disposed front and rear legs, a cot fixing rod connected between the respective rear legs and corresponding arm members, each of said cot fixing rods having one end pivotally connected to the upper end of the associated rear leg and having its other end pivotally connected to the lower end portion of the corresponding arm member above the pivotal



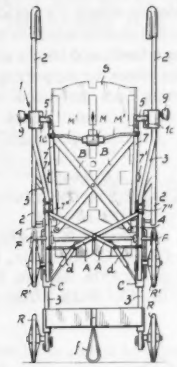
connection between said arm member and the upper portion of the corresponding front leg, and a rear cross-struts including intersecting rear strut members pivotally connected intermediate the ends thereof, means pivotally connecting the lower end of said rear cross-struts to a corresponding rear leg, and a tie rod interconnecting the upper ends of said rear cross-struts to its corresponding side-strut.

4,077,641

BABY CARRIAGE FOLDABLE IN WIDTH AND SHORTENABLE IN HEIGHT

Giuseppe Perego, Arcore (Milan), Italy, assignor to Perego-Pines S.p.A., Italy

Filed Aug. 11, 1976, Ser. No. 713,493
Claims priority, application Italy, Apr. 26, 1976, 22657/76
Int. Cl.[2] B62B *7/08*
U.S. Cl. 280—42 **7 Claims**



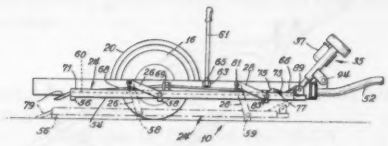
1. A baby carriage adapted to fold between a folded position and an extended position having a pair of front leg members, wheels mounted on said front leg members, a slider slideably mounted along a lower portion of the respective front leg members, a sleeve fixedly connected to the upper end portion of the respective front leg members, a corresponding handle slideably disposed relative to said sleeve and having a lower end portion connected to a corresponding slider, the improvement comprising opposed frame members, said frame members being connected at one end to said sleeve and at its other end to a corresponding front leg member, a foldable seat back interconnected between said frame members, folding tong members formed by a pair of elongated arms interconnected intermediate their ends, each of said arms having their respective upper ends pivotally connected to a corresponding frame member and their respective lower ends pivotally connected to said slider slideably mounted on said front leg portion, actuating means interconnected between said frame members for effecting the collapsing and expansion of said tong members, a pair of rear leg members having wheels mounted on a lower end thereof, means for pivotally connecting an upper end of said rear leg members to a corresponding front leg member along an intermediate portion of said corresponding front leg member, a second set of folding tong members formed by elongated arms interconnected intermediate the ends thereof, said elongated arms of said second set having their respective upper ends hingedly connected to a corresponding rear leg member, a corresponding tie rod having one end thereof hingedly connected to the other end of said elongated arms of said second set, said tie rods having its respective other ends pivotally connected to said corresponding rear leg members whereby said rear leg members are collapsed and expanded in unison with said front leg members when said actuating means is operated and a pair of connecting rod means each having one end pivotally connected to an intermediate portion of one of said rear leg members and the other end pivotally connected to one of said corresponding sliders for collapsing and extending said rear legs.

4,077,642

MOVABLE BED TRAILER

Bobby Dean Clark, Shoshoni, Wyo., assignor to Chair-E-Yacht, Inc., Shoshoni, Wyo.

Filed Jan. 21, 1976, Ser. No. 651,196
Int. Cl.[2] B62D *33/08*
U.S. Cl. 280—43.2 **10 Claims**



1. A trailer comprising:
a frame;
wheel means journaled for rotation on opposite sides of said frame for rollably supporting it along the ground;
a load bed movably mounted on said frame;
link means movably connecting said bed to said frame for enabling the bed to be raised and lowered relative to said frame in a substantially horizonatal disposition during the raising and lowering of said bed;
driving means mounted on said frame for controlling the raising and lowering of said bed relative to said frame;
a mechanism driven by said driving means for moving extensively toward said bed and alternatively for retracting therefrom toward said frame, said mechanism having a distal end portion connected to said bed;
mounting means for attaching pivotally said mechanism to said frame;
connecting means for attaching pivotally said distal end portion of said mechanism to said bed; and
said link means includes a plurality of single links; each one of said links being pivotally connected at one of its ends to said frame and at its opposite end to said load bed, each one of said links extending forwardly and downwardly from said frame to said bed when said bed is raised, each one of said links extending forwardly and downwardly at almost a vertical disposition when said bed is lowered to ground level, said links being movable pivotally further in the same direction as their bed-lowering direction after said bed rests at ground level and said mechanism pivoting

to enable said driving means and said mechanism to move said frame upwardly relative to said bed to raise said wheel means above ground level.

7. The method of operating a trailer of the type having wheel means journaled for rotation on opposite sides of frame means for supporting it rollably along the ground and having a load bed movably mounted on said frame means by a plurality of links to enable the bed to be raised and lowered relative to the ground, each one of said links being pivotally connected at one of its ends to said frame means and at its opposite end to the bed, driving means being provided for actuating a mechanism pivotally mounted on said frame means and pivotally connected to the bed for moving extensively toward and away from said frame means to raise and lower the bed, comprising:

causing said drive means to move said mechanism extensively for lowering the bed to the ground until the bed rests on the ground;

continuing to cause said drive means to move said mechanism extensively for raising said frame means relative to the bed for raising said wheel means above ground level;

subsequently causing said drive means to retract said mechanism for lowering the frame until said wheel means rest on the ground; and

continuing to cause said drive means to retract said mechanism for raising the bed upwardly toward said frame means.

4,077,643

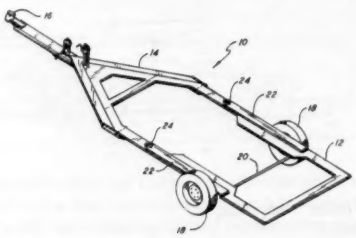
DROP FRAME TRAILER

Dean E. Bates, 66 Terrace Dr., Binghamton, N.Y. 13905

Filed Jul. 12, 1976, Ser. No. 704,123

Int. Cl.² B62D *21/18*

U.S. Cl. 280—43.18 **3 Claims**



1. A utility trailer, comprising;

a frame for holding an item to be transported;

means for suspending said frame from two or more wheels said suspension means comprising lever means pivotally connected at one end thereof to said frame and having a spring means connecting said lever means to an axle, which axle connects said wheels together for raising or lowering a rear portion of said frame in response to a force applied at a free end of said lever means;

a yoke having a hitch connected to a first end thereof and having second and third ends thereof pivotally connected to points on said frame between a point of attachment of said suspension means and a forward point on said frame, said yoke allowing a forward portion of said frame to be raised and lowered independent of said rear portion of said frame said yoke device being of sufficient length to allow said forward portion of said frame to be lowered to ground level with minimum depression from the horizontal of said yoke device at said hitch connected to a towing vehicle;

a first winch mounted on a forward portion of said frame for controlling a first tension cable said first tension cable connected to said free-end of said lever means for raising or lowering a rear portion of said frame as said winch is operated;

a second winch mounted on a forward portion of said yoke having a second tension cable wound thereon, an end of said second tension cable attached to a point on said forward portion of said frame for controlling the raising and lowering of said forward portion of said frame independently from the raising and lowering of said rear portion of said frame.

4,077,644

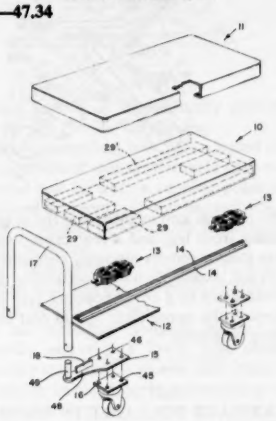
PLATFORM HAND TRUCK

Michael A. Roby, and Glen E. Tomblin, both of Winchester, Va., assignors to Rubbermaid Commercial Products Inc., Winchester, Va.

Filed Oct. 12, 1976, Ser. No. 731,368

Int. Cl.² B62B *3/02*

U.S. Cl. 280—47.34 **14 Claims**



1. A platform hand truck having a rectangular integrally formed platform provided with a deck having a planar top surface and a depending rim flange and a patterned reinforcing rib structure on its underside, said rib structure having a plurality of recesses therein, a plurality of adaptor blocks of lesser number than the recesses, means for detachably securing said blocks in said recesses in various selective arrangements, caster bracket plates having wheels, said blocks adapted to be secured to said caster bracket plates for supporting said platform, and longitudinal supporting bars embraced by said blocks and adapted for resting on said bracket plates.

4,077,645

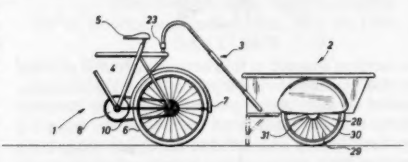
TRAILER ASSEMBLY AND CONNECTOR UNIT THEREFORE

Charles W. Dortch, and Donald K. Vaught, both of Houston, Tex., assignors to George C. Ballas, Sr., Houston, Tex.

Filed Jun. 18, 1976, Ser. No. 697,677

Int. Cl.² B62K *27/00*

U.S. Cl. 280—204 **5 Claims**



1. A trailer assembly towable by a bicycle and the like comprising:

a bed section for supporting a portable load and having a single axle portion located perpendicular to the course of travel of said trailer assembly, said bed section including

front, rear, bottom and side walls, the rear wall of said bed section sloping away from said front wall, an axle bracket member for attachment to the bed section, said axle being located within the bracket member, said bracket including a plurality of V-shaped sections for absorbing shock,

a pair of wheel members each rotatably mounted at one end of said axle portion of said bed section,

a draw bar member rigidly connected at one end to said bed section and having a goose-neck configuration with a socket connector portion at the other end of said draw bar member, said draw bar member including a pair of elongated members extending upwardly of said bed section and terminating in an extended and elongated third member of said goose-neck configuration,

a hitch assembly having a ball portion releasably mated with said socket connector portion of said draw bar member and further having provision for interconnecting with said bicycle to position said ball portion above the rear wheel and aft of the seat of said bicycle, said ball portion of the hitch assembly further being positioned forward of the rear axle of said bicycle, said hitch assembly including brace means for interconnecting with said bicycle, said ball portion being in an upward thrusting position with respect to said brace means, and

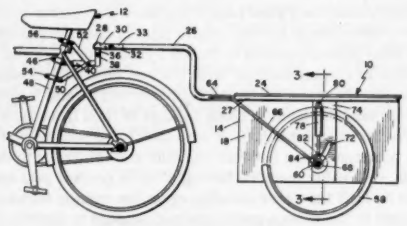
kick-stand means attached to said bed section for supporting said bed section in a generally level plane, means for mounting said kick-stand means for pivotal movement with respect to said bed section, means for maintaining said kick-stand in a substantially vertical plane including locking means extending between said kickstand and said bed section, means for maintaining said kickstand in a position substantially parallel to the bottom of said bed section, said kick-stand being constructed of a length of tubing formed into a closed loop of rectangular configuration.

4,077,646

BICYCLE TRAILER

William Andrew Watkins, 402 63rd St., San Diego, Calif. 92114

Filed Oct. 1, 1976, Ser. No. 728,755
Int. Cl.[2] B62K *27/06*
U.S. Cl. 280—204 7 Claims



1. A trailer adapted to be towed by a bicycle comprising:

a box-like body chassis having a slot in each side thereof, a forward end, and a tow bar secured to and extending forward from said forward end;

a pair of axles slidably mounted in said slots,

torsion bar suspension means connected to said tow bar and to said axles for supporting said pair of axles, one on each side of said body chassis;

a wheel rotatably mounted on each axle for supporting said body for translation along the ground; and

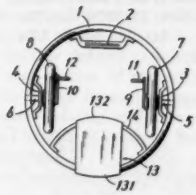
universal hitch means for connecting said tow bar to a bicycle and including a ball and socket coupling means for permitting said bicycle to lean from the vertical with respect to said trailer.

4,077,647

RIDABLE AMUSEMENT DEVICE

Yutaka Nagayama, Kishiwada, Japan, assignor to Nagayama Electronic Industry Co., Ltd., Kishiwada, Japan

Filed Jul. 28, 1976, Ser. No. 709,517
Int. Cl.[2] B62M *1/14*
U.S. Cl. 280—211 36 Claims



1. A ridable amusement device comprising:

an annular frame;

mutually independent rotatable main wheels disposed on opposite sides of said frame including axles which are aligned with each other;

handles associated respectively with said main wheels for manually driving said main wheels independently of each other;

a seat provided with a backrest and disposed in the rear region of said frame;

a footrest disposed in the front region of said frame and being positioned in front of said seat with a predetermined space defined therebetween;

a swiveled auxiliary wheel including an axle supported in the rear region of said frame; and

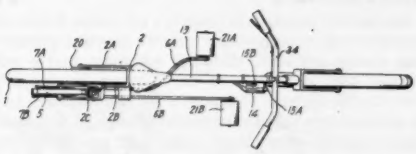
a friction brake device comprising a brake shoe adapted to rub against a ground surface when said brake device is actuated.

4,077,648

BICYCLE PROPULSION AND SPEED CHANGE MEANS

Man Taik Seul, 633-97, Seoul, Korea

Filed Oct. 18, 1976, Ser. No. 733,174
Claims priority, application South Korea, Oct. 18, 1975, 2264
Int. Cl.[2] B62M *1/04*
U.S. Cl. 280—236 10 Claims



1. Propulsion means for a foot-operated bicycle comprising:

a. rear frame means comprising first and second bifurcated sections;

b. a pair of propulsion levers pivotally connected in said second bifurcated sections of said rear frame means, said levers comprising pedals for pumping said levers up and down and first speed change means;

c. rear wheel means and sprocket means rotatably mounted in engagement in said bifurcated section, whereby said sprocket means drives said rear wheel means;

d. propulsion wheel means rotatably mounted in said second bifurcated section; said propulsion wheel means comprising engaging means to drive said sprocket means;

e. second speed change means comprising a pair of driving lever means rotatably mounted in said second bifurcated section in engagement with said propulsion wheel means, whereby said driving lever means drive said propulsion wheel;

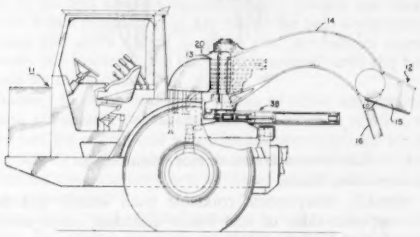
f. connecting arm means between said first and second speed change means.

4,077,649

ARTICULATED VEHICLE HITCH

Dale Wyatt Hawk, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

Filed Nov. 26, 1976, Ser. No. 745,104
Int. Cl.[2] B60D *7/04*
U.S. Cl. 280—420 **6 Claims**



1. In a mounting for an articulated vehicle wherein a draft unit is structurally connected to a trailer unit by means of a vertical hitch shaft carried by one of the units and a complementary shaft-receiving bearing surface carried by the other unit permitting the interconnected units to be angled relative to each other, and the draft and trailer units are functionally interconnected by means of flexible control lines which couple controls on the draft unit to actuators on the trailer unit actuable in response to the draft unit controls, the improvement comprising

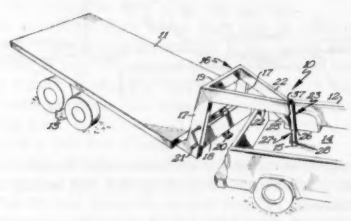
an aperture formed in and extending transversely through the pivot axis of said vertical hitch shaft with said flexible control lines passing therethrough between said draft unit and said trailer unit.

4,077,650

CUSHIONING MEANS FOR GOOSE NECK HITCH

Clayton R. Leach, Jr., Fairmont, Minn., assignor to Fairmont Steel Products, Inc., Fairmont, Minn.

Filed Dec. 6, 1976, Ser. No. 748,097
Int. Cl.[2] B60D *1/00*
U.S. Cl. 280—423 R **6 Claims**



1. A goose neck hitch device for use in interconnecting a trailer to a towing vehicle comprising:

a goose neck frame, said frame including a pair of elongate vertical frame members adapted to be secured to the trailer at the front end thereof,

a pair of elongate horizontal frame members each being rigidly secured to the upper end of one of said vertical frame members and projecting and converging forwardly therefrom,

a tubular upper vertical hitch member rigidly secured to said longitudinal frame members and depending therefrom,

a tubular lower vertical hitch member telescopically engaging said upper hitch member and having coupling means at the lower end thereof adapted to be coupled to cooperating coupling means on the towing vehicle forwardly at the rear portion of the towing vehicle,

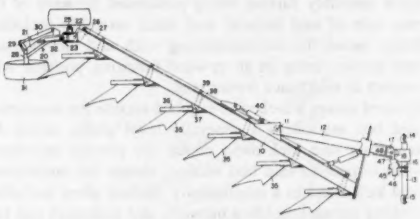
a cushioning mechanism including a yieldable member disposed interiorly of said upper hitch member and engaging the upper end portion of said lower hitch member, means on said upper hitch member engaging said yieldable member whereby said yieldable member is yieldable in response to vertical forces exerted by the trailer through the hitch frame to thereby absorb and dampen such forces.

4,077,651

HYDRAULIC STEERING FOR PLOW

James Gerald Steinbach, Davenport, Iowa; Gary Allen Rehn, Andover, Ill., and William Wayne Jackson, Bettendorf, Iowa, assignors to Deere & Company, Moline, Ill.

Filed Oct. 1, 1976, Ser. No. 729,611
Int. Cl.[2] A01B *69/00*; B62D *53/00*
U.S. Cl. 280—426 **15 Claims**



1. In a plow having an elongated main frame adapted for support at its forward end on a tractor so as to permit lateral swinging of the plow relative to a tractor for purposes of turning, said frame having at its rear end a vertically shiftable structure, a steerable wheel carried on the structure, a hydraulic lift cylinder having a fluid pressure source and extending between the frame and vertically shiftable structure for raising and lowering the frame relative to the ground, the improvement residing in: a master cylinder anchored at opposite ends to shift with the tractor and plow respectively to thereby sense turning of the tractor; a slave cylinder anchored at opposite ends to the vertical shiftable structure and wheel for effecting steering of the latter; first and second conduit means extending respectively between the rod ends of the slave and master cylinders and the closed ends of the slave and master cylinders; and a valve means having a valve inlet in communication with the fluid pressure source to the lift cylinder and a pair of valve outlets in communication with the rod ends and closed ends respectively of the master and slave cylinders and including a valve member biased to block passage of fluid from the inlet to the outlet in communication with the closed ends while retaining communication between the inlet and the outlet to the rod ends, said valve member having a valve control part engageable to shift the valve member upon the tractor turning with respect to the plow a predetermined amount to thereby afford communication between the outlets to the rod and closed ends.

4,077,652

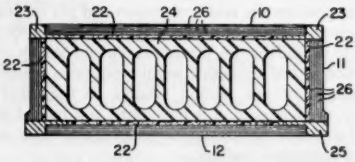
PLASTIC SKI SURFACING SYSTEM

Harold O. McCaskey, Jr., Allendale, S.C., and Salvatore E. Palazzolo, Elizabeth City, N.C., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Division of Ser. No. 559,939, Mar. 19, 1975, Pat. No. 3,967,992, which is a continuation of Ser. No. 326,910, Jan. 26, 1973, abandoned. This application Apr. 6, 1976, Ser. No. 674,267
Int. Cl.[2] A63C *5/00*; B32B *27/08*
U.S. Cl. 280—610 **8 Claims**

1. A ski resistant to delamination comprising a flexible core surrounded by and bonded to a top surface, base surface, and side wall surfaces between the top surface and base surface,

wherein the top surface comprises a refinishable, molded layer of a plurality of laminated stress relieved polyacrylate sheets having weight average molecular weights of between about 260,000 and about 654,000 and consisting essentially of poly(-



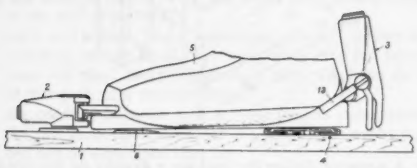
methyl methacrylate), said sheets having been stress relieved, by laminating them together at between about 100 psi to 600 psi and about 120° to 165° C, causing the sheets to shrink between about 2–15%.

4,077,653

HEEL HOLD-DOWN PLATE OR PIVOT MEMBER OF SAFETY SKI BINDING

Jean Joseph Alfred Beyl, Boulevard Victor Hugo, 58000 Nevers, France

Filed Nov. 20, 1975, Ser. No. 633,935
Claims priority, application France, Nov. 29, 1974, 74 39308
Int. Cl.² A63C *9/08*
U.S. Cl. 280—620 **8 Claims**



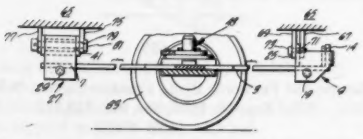
1. A safety ski binding comprising a toe device, a supporting assembly for said boot, a heel hold down device on said supporting assembly for releasably retaining said boot, said supporting assembly comprising a supporting member for said boot, a fixed mounting member on said ski, said supporting member being rotatably and slidably mounted on said mounting member and resilient means interposed between said supporting and mounting members to control the sliding movement of said supporting member on said ski, said heel hold down device controlling rotational movement of said supporting member, said mounting member restraining said supporting member against movement of the supporting member in a direction normal to the plane of the ski.

4,077,654

SPRING SUSPENSION

Vernon Brandt, Reedley, Calif., assignor to Brandt Manufacturing, Inc., Reedley, Calif.

Filed Jun. 30, 1975, Ser. No. 591,715
Int. Cl.² B60G *11/00*
U.S. Cl. 280—718 **1 Claim**



1. A spring suspension system for mounting to an axle assembly and a vehicle body comprising:

a king pin;

a spring member;

a first bracket member adapted to receive and secure a first end portion of said spring member, a second bracket member adapted to receive and secure a second and opposite end portion of said spring, said first bracket being pivotally mounted to said vehicle body, both said first and second bracket members being mounted on a longitudinal axis with respect to said vehicle body, said first bracket member being further defined as being positioned to secure said first end portion of said spring member at an elevation which differs from the elevation of said axle assembly, thereby inclining said axle assembly and said king pin housed therein to an angle between 0.5° and 4° from the vertical; and

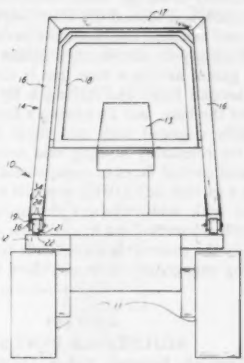
clamping means for securing said spring to said axle assembly.

4,077,655

SHOCK MOUNT FOR PROTECTIVE STRUCTURE FOR TRACTORS

Richard John Skahill, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed Apr. 27, 1977, Ser. No. 791,231
Int. Cl.² B60R *27/00*; F16B *9/00*
U.S. Cl. 280—756 **5 Claims**



1. In a shock mount for a protective structure for tractors, a tractor having a chassis, a tractor roll-over protective structure including a post extending upwardly from said chassis and having a pair of spaced lower end members with aligned mounting openings therein, a mounting member affixed with said chassis and interposed between the lower end members of said post and having an opening aligned with said post openings, and an assembly of a pair of elastomer inserts and a pair of bushings and a bolt all disposed in said aligned openings and connected with said post for securing said post to said chassis, the improvement comprising each of said elastomer inserts being of an elongated sleeve configuration having a free-body tapered inner opening of a reduced cross-sectional size from the exterior to the interior of said elastomer insert, each of said bushings being of an elongated sleeve configuration and having a bolt opening therethrough and having an outer periphery snugly disposed in said post mounting opening and being tapered on the exterior surface of said bushing and with the target cross-sectional size of the taper being larger than the largest cross-sectional size of said insert inner opening, said inserts being oppositely disposed in end-to-end axial alignment in said mounting member opening and said bushing being disposed within said insert inner opening and said bolt being snugly disposed in said bushing bolt opening and with said bolt being tightened against the axial end of said bushing and thereby having said bushing taper force radially outwardly on said elastomer insert to force said elastomer insert snugly into

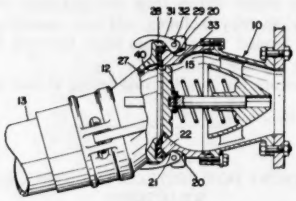
said mounting member opening for a snug fit of said assembly with said post and said member.

4,077,656

SEALED JOINT AND GASKET THEREFOR

Henry A. Swindler, Palo Alto, Calif., assignor to Parker-Hannifin Corporation, Cleveland, Ohio

Filed Sep. 21, 1976, Ser. No. 725,075
Int. Cl.² F16L *17/06*
U.S. Cl. 285—110 **5 Claims**



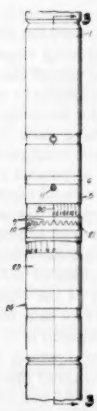
1. A joint comprising a first member having a first annular transverse face, a second member having a second annular transverse face axially opposed to said first face and having a third annular transverse face radially inwardly of the second face and axially inwardly offset therefrom a fixed predetermined distance, said second and third faces being integral parts of said second member, said members having aligned fluid flow passages centrally of said faces, a gasket between said members, said gasket having a base that is clamped between said first and second faces and having a lip projecting radially inwardly of the base, said lip having a first side with a sealing edge initially engaged with said third face, means on said members for releasably holding said members together with said first and second faces in engagement with said base, said lip having a second side axially opposite said first side and out of contact with said members throughout substantially its entire length whereby fluid in said flow passages may act on substantially the entire said second side to press said edge into tight sealing engagement with said third face.

4,077,657

ADJUSTABLE BENT SUB

Kurt H. Trzeciak, Fountain Valley, Calif., assignor to Smith, International, Inc., Newport Beach, Calif.

Filed Mar. 22, 1976, Ser. No. 669,312
Int. Cl.² F16L *27/00*
U.S. Cl. 285—184 **14 Claims**



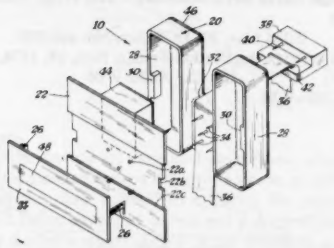
1. An adjustable bent sub comprising a hollow tubular box section, a box at one end of said box section, and a hollow tubular pin section, a pin at one end of the pin section, an end of the box section mating with an end of the pin section, the plane of the said end of the box section is inclined at an angle to the axis of the box section and the plane of said end of the pin section is inclined at an angle to the axis of the pin section, means to position the said box section and pin section at various azimuthal angles of displacement of the box section with respect to the pin section, means to lock said box section to said pin section at said azimuthal angular positions against angular displacement of one section relative to the other section, whereby the box section is positioned and locked at various vertical angles of the box section with respect to the pin section for each azimuthal position.

4,077,658

TAMPER INDICATING SECURITY DEVICE FOR DRAWERS

Norman T. Jacobsen, 640 NW. 35th Ct., Fort Lauderdale, Fla. 33309

Filed Jun. 28, 1976, Ser. No. 700,549
Int. Cl.² E05C *19/18*
U.S. Cl. 292—307 R **3 Claims**



1. A security device for locking a drawer or the like in a closed position which also provides an indication if someone has tampered with the device comprising:

a first chamber and a second chamber, each chamber having a raised wall portion;

a first block connected to one side of said first chamber and one side of said second chamber;

a plurality of spikes connected to one side of said first block, the pointed ends of the spikes being in the direction of the chamber openings of said first and second chambers;

a first and second chamber cover plate;

a second block connected to one side of said cover plate and sized to be received between said first and second chambers, said cover plate having a plurality of apertures for receiving the ends of said spikes, said cover plate having side notched portions;

a locking member, said locking member having a first and second resilient flange, each flange disposed at opposite ends connected to one side of said locking member, said first and second locking member flanges being receivable through the notches in the sides of said cover plate and connectable to said raised block wall portions within said first and second chamber, said first and second block being disposed to provide separation for receiving a ribbon therebetween in the closed position.

4,077,659

GOLF BALL TEEING DEVICE

Paul Sievers, 986 Fenworth Blvd., Franklin Square, N.Y. 11010

Filed Sep. 16, 1976, Ser. No. 723,812
Int. Cl.² A63B *47/02*
U.S. Cl. 294—19 A **4 Claims**

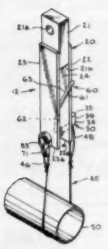
1. A golf ball teeing device comprising:

a. a shaft;

b. first and second resilient subshafts;
c. said subshafts extending parallel to the axis of said shaft;
d. means for attaching said first and second resilient subshafts to one end of said shaft, said means comprising:
i. a connected hairpin bend at the upper end of said resilient subshafts;
ii. an axial hollow in said shaft;
iii. said hairpin bend being fitted into said axial hollow
iv. flattened portions of said shaft being over at least the region occupied by said hairpin bend
e. first and second arcuate fingers attached to said first and second subshafts, said arcuate fingers terminating in ends;
f. said first and second arcuate fingers being curved in opposing arcs having concave sides facing each other;

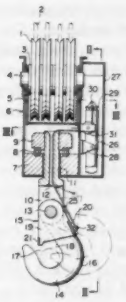
g. said arcuate fingers being in a plane substantially normal to the axis of said shaft;
h. each said arcuate finger containing a lateral arcuate continuously curved bend, said bend being directed upward from said plane and being directed outwards from the arc of that particular arcuate finger;
i. the opening between said arcuate fingers being smaller than the great circle diameter of a golf ball whereby a golf ball can be supported thereon;
j. the axis of said shaft passing outside the center of said golf ball when said golf ball is supported by said arcuate fingers; and
k. the ends of said arcuate fingers leaving a gap of at least ¼ inch therebetween.

4,077,660
SLING
William H. Phillips, Rte. No. 2, Carthage, Tex. 75633
Filed Nov. 8, 1976, Ser. No. 739,444
Int. Cl.² B66C *1/14*
U.S. Cl. 294—75 **3 Claims**



3. A sling for use in holding an object comprising:
a. a support member;
b. a rotatable member carried by and rotatable relative to said support member;
c. said rotatable member having first and second ends which extend laterally from said support member;
d. flexible support means for looping about the object to be held and having one end secured with said first end of said rotatable member and a second end for releasably engaging with said second end of said rotatable member;
e. said second end of said rotatable member including retaining means to aid in retaining said second end of said flexible support means engaged therewith when said rotatable member is in one position while said flexible support means holds the object;
f. actuating means associated with said rotatable member to rotate said rotatable member to a second position for disengagement of said second end of said flexible support means from said second end of said rotatable member to release the sling from its hold on the object;
g. restraining means to restrain said rotatable member against rotation from said one position while said flexible support means holds the object; and
h. said actuating means being constructed and arranged so that when the object is not held by said flexible support means said rotatable member automatically rotates from said one position to said second position for disengagement of said second end of said flexible support means from said rotatable member.

4,077,661
CRANE HOOK APPARATUS
Kiichiro Inahashi, Yokohama, Japan, assignor to Kabushiki Kaisha Nippon Kijuki Seisakushio, Tokyo, Japan
Filed Jul. 29, 1976, Ser. No. 709,670
Claims priority, application Japan, Jul. 31, 1975, 50-106024[U]
Int. Cl.² B64D *17/38*
U.S. Cl. 294—83 R **4 Claims**



1. A crane hook apparatus comprising
(a) a hanging body suspended by a rope from a winch,
(b) a stem mounted on the hanging body and having an axial bore and a pair of downwardly depending limbs,
(c) a shaft extending between and connected at its opposite ends to the pair of limbs,
(d) a hook rockably mounted on the shaft and having an external convex surface and an internal concave surface which defines a recess therein,
(e) a locking device rockably mounted on the shaft and normally assuming by gravity its operative position in which it substantially closes the opening of the recess, the locking device including a first portion operable in the operative position of the device to permit its inward movement to its inoperative position in which it clears the opening of the recess but to block its outward movement, thus halting the locking device, and also including a second portion which bears against the internal surface of the hook when it is moved to its inoperative position,
(f) remotely controllable drive means carried by the hanging body for initially moving the locking device to its inoperative position, and subsequently moving the hook through

the second portion in a manner such that the recess opens in the horizontal direction, and

(g) a suspension member passing through the axial bore in the stem to connect the drive means and the locking device together.

4,077,662

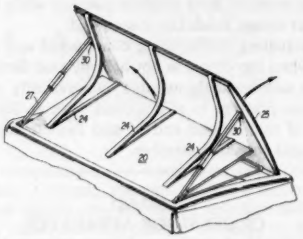
EXPANSIBLE CAMPER

Clarence B. Kauffman, R.D. No. 1, Atglen, Pa. 19310

Filed Apr. 1, 1975, Ser. No. 564,110

Int. Cl.² B60P *3/32*

U.S. Cl. 296—23 G **20 Claims**



13. In a camper vehicle, a body for the vehicle including an interior ceiling panel on the top thereof and a roof above said ceiling panel whereby there is sufficient space in said body under said ceiling panel for a person of normal size to be seated with space between his head and said ceiling panel, said roof being hingedly connected to said body on one side and said ceiling panel being hingedly connected to said body on a side opposite said hinged connected for said roof, said roof being pivotable upwardly to an open position about its hinged connection through an arc of movement of at least 45° and not more than about 90° and said ceiling panel being pivotable to an open position about its said hinged connection through an arc of movement of at least about 180°, supporting means interconnected to said body for securing said roof and said ceiling panel from said roof in place relative to said body after their respective pivoted movement, and covering means connectable to both said roof and said ceiling panel for defining space above said vehicle which is coextensive with the space in said vehicle when said roof and said ceiling panel are in their open positions whereby there is sufficient space for a person of normal size to stand in said body.

4,077,663

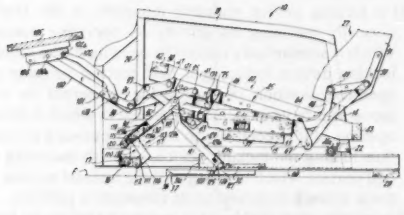
RECLINER LOUNGERS

Izchak Cycowicz, Brooklyn, N.Y.; Robert Joseph Caldwell, Bayonne, N.J., and Ming-Shean Ueng, New York, N.Y., assignors to Mohasco Corporation, Amsterdam, N.Y.

Filed May 5, 1976, Ser. No. 683,480

Int. Cl.² A47C *1/02*

U.S. Cl. 297—83 **20 Claims**



1. A chair comprising a chair body, a horizontal stationary track adapted to be supported on a floor, means for mounting said chair body on said stationary track for horizontal longitudinal sliding movement of said body relative to said stationary track, a seat link, linkage mechanism connecting said seat link with said body to permit movement of the seat link from upright chair position to inclined position and back from inclined position to upright position, and linkage connecting said stationary track with said linkage mechanism, to cause said body to move longitudinally forwardly relative to said stationary track while being slidably supported on said stationary track, as said seat link moves from upright chair position to inclined chair position, and to move said body rearwardly relatively to said stationary track as said seat link moves back from inclined position to upright position, said linkage comprising a first link pivoted to said body, a second link pivoted to said stationary track and to said first link, a third link pivoted to said linkage mechanism, and means to movably interconnect said third link to one of said first and second links.

4,077,664

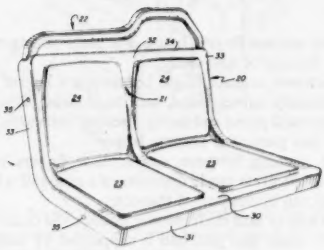
SEAT WITH CUSHIONED GRAB BAR

Arthur J. Harder, Jr., Franklin Park, Ill., assignor to Coach and Car Equipment Corporation, Elk Grove Village, Ill.

Continuation-in-part of Ser. No. 533,253, Dec. 16, 1974, Pat. No. 4,042,663. This application Jul. 26, 1976, Ser. No. 708,483

Int. Cl.² A47C *4/52*

U.S. Cl. 297—183 **6 Claims**



1. In a seat having a frame with a vertical, tubular side rail on each side of the seat back, said tubular side rail terminating at an open upper end defined by an edge, and a cushioned grab bar located above the top of said seat back, said cushioned grab bar comprising:

a round, metal, tubular, rigid inner member shaped to a predetermined longitudinal configuration;

an annular outer layer of resilient cushioning material enclosing said inner tubular member and extending substantially coextensively with said inner tubular member to an exposed end portion of said outer layer;

a terminal part extending axially from said tubular member at each end of said grab bar, beyond the exposed end portion of said layer of resilient cushioning material and into the open upper end of said tubular side rail;

and means for securing said terminal part within said tubular side rail;

said outer layer of resilient cushioning material comprising means at said exposed end portion thereof for abutting and covering said edge of said open upper end on the tubular side rail.

4,077,665

PLASTIC RESTAURANT BOOTH SEAT

Adam Storch, Santa Ana, Calif., assignor to International Installations, Los Angeles, Calif.

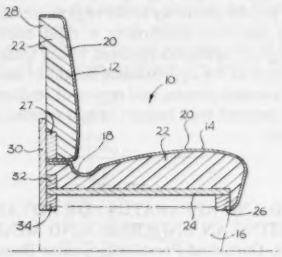
Filed Apr. 22, 1976, Ser. No. 679,232

Int. Cl.² A47C *15/00*

U.S. Cl. 297—244 **8 Claims**

1. A restaurant booth seat configured to be easily assembled comprising, two separate basic elements, each of said elements

having an exterior occupant supporting skin of hard rigid plastic material and a substantially rigid plastic foam core, said elements being (i) a back support member selectively secured to (ii) a base member; said base member having an upper surface tapered from the front thereof toward the rear such that liquids, crumbs and the like are encouraged toward the rear of said base member, said seat further having a grooved area



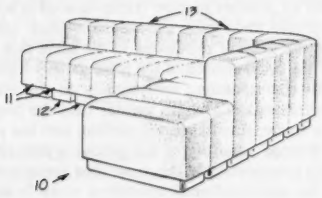
formed in said base member covered by said exterior skin and extending along the width of said base member adjacent said back support member whereby crumbs, liquid and the like in said grooved area are rendered easily removable, said back support member and said base member each having a plurality of support members integrally formed within said foam core such that said back support member and said base member can be selectively joined together in a secure manner.

4,077,666

MODULAR SEATING ARRANGEMENT AND METHOD

Jules M. Heumann, San Francisco, Calif., assignor to Metropolitan Furniture Manufacturing Co., South San Francisco, Calif.

Filed Feb. 28, 1977, Ser. No. 773,053
Int. Cl.² A47C *15/00*
U.S. Cl. 297—440 **10 Claims**



1. A modular furniture arrangement comprising a pair of adjacent bases each defining at least one female socket means therein;

a furniture component disposed on each of said bases;

a releasable male fastening means secured to said furniture component and expanded into interlocking relationship within said female socket means; and

a T-shaped connector releasably attaching said bases together comprising a central portion disposed between said bases to space said bases relative to each other and an upper portion disposed in straddling and interlocking relationship relative to side edges of said bases.

4,077,667

MEANS FOR CUSHIONING WOODEN PEWS OR THE LIKE

Arnold G. Allerheiligen, 702 Lincoln St., Holdrege, Nebr. 68949

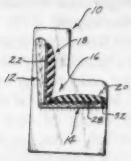
Filed Apr. 8, 1974, Ser. No. 459,063
Int. Cl.² A47C *1/02*
U.S. Cl. 297—445 **3 Claims**

1. A pre-fabricated z-piece means for cushioning pews or the like having seat and back portions and a forward edge, comprising,

a seat member secured to the seat portion of the pew comprising a first flat sheet member, said first sheet member having opposite ends, and rearward and forward edges, a first layer of resilient material positioned adjacent the top surface of said first flat sheet member, and a first flexible cover extending over the top surface of said first layer of resilient material, said first flexible cover being secured at its periphery to said first sheet member,

a back member secured to the back portion of the pew comprising a second flat sheet member, a second layer of resilient material positioned adjacent the front surface of said second sheet member, and a second flexible cover extending over the frame surface of said second layer of resilient material, said second flexible cover being secured at its periphery to said second sheet member,

a first rigid support member secured to the forward edge of



said first sheet member and extending downwardly therefrom, forwardly of said seat portion and having a forward side,

the forward edge of said first sheet member being positioned forwardly of the forward edge of the seat portion,

said first layer of resilient material extending downwardly over said forward edge and being positioned adjacent the forward side thereof, said first flexible cover extending downwardly over said downwardly extending portion of said first layer of resilient material and being secured to said first support member, said first layer of resilient material being positioned adjacent the forward side of said first support member,

said first support member being positioned adjacent to and forwardly of the forward edge of said seat portion,

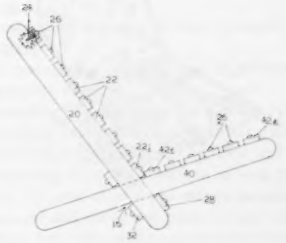
said first support member having a substantially rectangular cross-section with its major axis disposed in a substantially vertical position so that said first support member substantially covers the forward edge of said seat portion.

4,077,668

TWO PART PORTABLE CHAIR CONSTRUCTION

Jeffrey H. Puccinelli, Blagen Rd., Arnold, Calif. 95223

Filed Dec. 13, 1976, Ser. No. 749,927
Int. Cl.² A47C *4/00*
U.S. Cl. 297—443 **8 Claims**



1. A chair construction of two unjoined and complementary

members wherein said members may be placed together in a first, chair providing configuration and may also be placed in a second, essentially flat storage and carrying configuration, said construction comprising:

a first member being of two symmetrical, oppositely facing and substantially parallel side pieces each having parallel major edges;

first cross brace means secured to said side pieces and extending transversely therebetween for holding said side pieces rigidly in relative position;

backrest means secured to said side pieces and extending therebetween in an upper portion of said first member for providing a backrest in said chair providing configuration;

said first cross brace means including a first transverse brace and a second transverse brace secured to front major edges of said side pieces, and third and fourth transverse braces secured to rear major edges of said side pieces thereby defining at least one gap through said first member below said backrest means and inside said parallel side pieces said gap lying between said first and second braces at said front edges and between said third and fourth braces at said rear edges;

said side pieces, said first cross brace means and said backrest providing means collectively defining a nesting recess in said first member, said recess being accessible at least at open upper and lower ends of said first member; and

a second member being of two symmetrical, oppositely facing, and parallel sides, each having parallel major edges, each having a thickness between said major edges no greater than the thickness between said major edges of the side pieces of the first member and no greater than the height of the gap;

seat means secured to said sides and extending therebetween in a front portion of said second member for providing a seat for said construction in its chair providing configuration;

second cross brace means secured to said sides transversely therebetween for holding them rigidly in relative position, and for providing a stop adjacently behind said seat means;

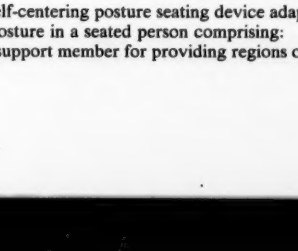
said sides being spaced apart for a distance less than the distance between said side pieces so that said second member may slide into said recess provided in said first member to provide said construction in said essentially flat storage and carrying configuration and so that a rear portion of said second member may also slide through said gap until said stop is reached to provide said construction in said chair configuration.

4,077,669

SELF-CENTERING POSTURE SEAT

Louis Fox, 100 Mt. Arlington Blvd., Landing, N.J. 07850

Filed Jan. 19, 1977, Ser. No. 760,647
Int. Cl.[2] A47C 7/02
U.S. Cl. 297—452 **9 Claims**



1. A self-centering posture seating device adapted to induce proper posture in a seated person comprising:

a seat support member for providing regions of resilient seat support to a seated person primarily in the spaced apart regions corresponding to the ischial tuberosities comprising a rigid seat frame and a plurality of stretched resilient bands intersecting within said frame in two regions spaced apart by the distance separating the ischial tuberosities of a seated person; and

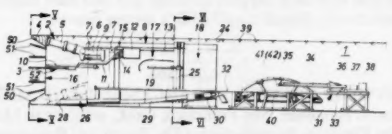
conjoined to said seat support member, a back support member for providing a region of resilient back support to a seated person primarily in the region corresponding to the lumbar vertebra comprising a rigid back frame and a plurality of stretched resilient bands intersecting within said frame at the approximate height of the lumbar vertebra of a seated person, said region of resilient back support being centered with respect to said regions of resilient seat support.

4,077,670

METHOD AND APPARATUS FOR ADVANCING AND SUPPORTING AN UNDERGROUND MINE GALLERY

Klaus Spies, Dortmund-Persebeck; Gunter Blumental, Westerhold; Karlheinz Bohnes, and Peter Marr, both of Bochum, all of Germany, assignors to Bochumer Eisenhutte Heintzmann GmbH & Co, Bochum, Germany

Filed May 3, 1977, Ser. No. 793,277
Claims priority, application Germany, May 15, 1976, 2621674
Int. Cl.[2] E21D 9/08, 11/18
U.S. Cl. 299—11 **10 Claims**



1. A method for advancing and supporting an underground mine gallery in which the contour of the gallery cross-section is produced by a mining machine and the gallery cross-section is supported by profiled support frames spaced in longitudinal direction of said mine gallery from each other, said method comprising the steps of producing in the mine face along the contour of the cross-section of the mine gallery a groove having a depth corresponding substantially to the distance between two frames and a width greater than the height of the profile of a frame; simultaneously drilling into the part of the mine face located inwardly of the groove a plurality of bore holes, while transporting at the same time loose material produced by the aforementioned operations away from the mine face; placing a support frame into the groove; bracing the support frame against the surrounding wall surface; connecting the newly placed support frame to a support frame previously placed into the mine gallery; placing explosives into said bore holes; exploding the explosives to remove the part inwardly of the groove from the mine face, while transporting loose material produced by the last step away from the mine face; advancing the machine in longitudinal direction of the mine gallery; and repeating all of the above-mentioned steps.

4,077,671

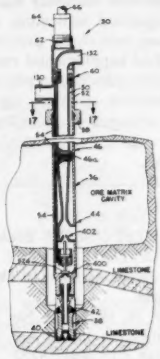
SUBTERRANEAN DRILLING AND SLURRY MINING METHOD

Philip R. Bunnelle, Santa Clara, Calif., assignor to FMC Corporation, San Jose, Calif.

Division of Ser. No. 704,277, Jul. 12, 1976. This application Apr. 6, 1977, Ser. No. 785,141
Int. Cl.[2] E21C 45/00
U.S. Cl. 299—17 **17 Claims**

1. A method of drilling a hole into and mining ore from a subterranean deposit of granular ore with apparatus including a multi-section tool string having a drill bit on its lower end; and a mining nozzle, an eductor nozzle and a foot valve, each

being movable between a drilling mode and a mining mode of operation comprising the steps of: alternately rotating and holding the outer portion of a multi-section tool string from rotation for screwing the outer portions together while assembling the string section-by-section, rotating and lowering the tool string while drilling a hole into the ore matrix to be mined, directing a substantial quantity of liquid during the drilling mode at system pressure through the foot valve into the hole for washing cuttings to the surface, closing the foot valve and opening the mining nozzle and eductor nozzle during the mining mode for terminating the major quantity of liquid flow into the bottom of the hole, splitting the liquid flow with a



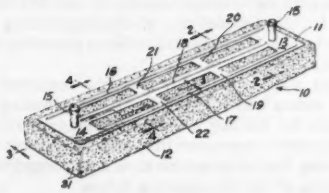
portion of the liquid being directed transversely of the tool string through the mining nozzle into the ore matrix to reduce the ore to a slurry and with another portion of the liquid directed upwardly through the eductor nozzle to pump the slurry to the surface, rotating the tool string during mining, and selectively controlling the opening and closing of the nozzles and foot valve while the tool string is in the hole by applying a control pressure equal to the system pressure during drilling for maintaining the mining nozzle and eductor nozzle closed and the foot valve open, and by applying a control pressure less than the system pressure during mining for opening the mining nozzle and eductor nozzle and closing the foot valve.

4,077,672

METHOD OF MAKING A SPONGE MOP PART

Frank T. Clark, Jr., Erie, Pa., assignor to Tantera, Inc., Girard, Pa.

Filed Sep. 27, 1976, Ser. No. 727,367
Int. Cl.[2] A47L *13/46*
U.S. Cl. 300—21 **2 Claims**



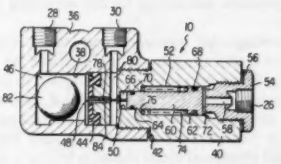
1. A method of making a sponge mop part comprising,
providing a sponge made of cellulose material of approximately the size of the mop desired,
introducing said sponge in its normal condition into a mold cavity having space in which said sponge is received and longitudinally recesses for receiving plastic material for forming ribs on said sponge,
compressing said sponge in said space by reducing the size of said mold cavity thereby exerting a force and compressing said sponge to approximately one sixteenth of its normal thickness to substantially compress all of its pores,
injecting plastic molding material into said recesses cavity against at least one side of said sponge and allowing said plastic to solidify thereby forming a plastic back,
removing said sponge and plastic back from said mold, and
moistening said sponge with water thereby expanding said sponge to its original size.

4,077,673

FLUID PRESSURE CONTROLLING DEVICE

Hiroshi Takeshita, Chiryu, and Hiroyuki Kondo, Toyota, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Jul. 7, 1976, Ser. No. 703,190
Claims priority, application Japan, Jul. 10, 1975, 50-85008
Int. Cl.[2] B60T *8/26*
U.S. Cl. 303—24 F **3 Claims**

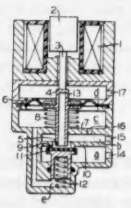


1. A fluid pressure control device for use in a vehicle fluid brake system comprising:
a housing having a first bore including a valve chamber and a stepped bore including a small diameter portion and a large diameter portion;
a stepped piston having a small diameter portion sealingly slidable in said small diameter bore portion and a large diameter portion sealingly slidable in said large diameter bore portion;
an outlet pressure chamber defined by one end of said stepped piston within said small diameter bore portion;
an inlet pressure chamber defined by the other end of said piston within said large diameter bore portion;
a passage connecting said first bore with said outlet pressure chamber;
a valve seat member in said first bore and separating said valve chamber and said passage;
a deceleration responsive valve member in said valve chamber and moving toward said valve seat to interrupt a fluid communication between said valve chamber and said passage when the vehicle deceleration reaches a predetermined value;
a first inlet connecting a source of fluid pressure with said valve chamber;
a second inlet connecting said source of fluid pressure with said inlet pressure chamber;
an outlet connecting said passage with a brake cylinder;
spring means urging said piston in a direction enlarging the volume of of said outlet pressure chamber; and
pin means extending from said one end of said piston into said passage, the end of said pin means passing through said passage and said valve seat to move said valve member away from said valve seat to permit said fluid communication between said valve chamber and said passage when fluid pressure in said source of fluid pressure reaches a predetermined value.

4,077,674
LINEARLY OPERATIVE ELECTRIC/FLUID PRESSURE VALVE DEVICE

Shigeaki Doto, Kobe, Japan, assignor to The Nippon Air Brake Co., Ltd., Kobe, Japan

Continuation of Ser. No. 593,685, Jul. 7, 1975, abandoned. This application Oct. 29, 1976, Ser. No. 737,091
Claims priority, application Japan, Jul. 27, 1974, 49/90026
Int. Cl.² B60T *15/02*
U.S. Cl. 303—40 **9 Claims**

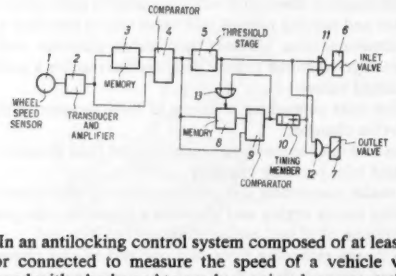


1. An electrically controlled, fluid pressure operated valve device comprising:
(a) a self-lapping valve assembly operative to provide a fluid output pressure according to the actuating force exerted thereon;
(b) electro-magnetic means subject to an electrical input signal for generating a magnetic force to provide said actuating force on said self-lapping valve assembly, said electro-magnetic means exhibiting a characteristic coil current versus magnetic force curve having a non-linear region in which said electro-magnetic means operates when said electrical input signal is below a predetermined value and a linear region in which said electro-magnetic means operates when said input signal exceeds said predetermined value; and
(c) means for providing a bias force in opposition to said magnetic force to thereby withhold operation of said self-lapping valve assembly until said electrical input signal exceeds said preselected value, whereby said fluid output pressure is accordingly proportional to said input signal.

4,077,675
ANTILOCKING CONTROL SYSTEM

Heinz Leiber, Leimen; Jürgen Gerstenmeier, Ngm.-Waldhilsbach, and Wolfgang Korasiak, Ketsch, all of Germany, assignors to Teldix GmbH, Heidelberg, Germany

Filed Dec. 6, 1976, Ser. No. 747,685
Claims priority, application Germany, Dec. 6, 1975, 2555005
Int. Cl.² B60T *8/02*
U.S. Cl. 303—95 **21 Claims**

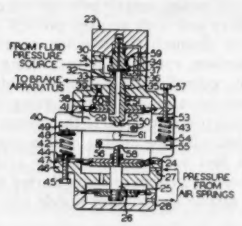


1. In an antilocking control system composed of at least one sensor connected to measure the speed of a vehicle wheel equipped with a brake and to produce a signal representative of the current wheel speed, an evaluation circuit connected to receive the signal from the sensor and generate a primary control signal, and a brake pressure control device connected to respond to the primary control signal to effect a variation in the brake pressure applied to the wheel brake in a manner to prevent the wheel from locking, the evaluation circuit acting to produce the primary control signal when the wheel speed decreases at greater than a predetermined rate, the improvement comprising signal deriving means including: wheel speed variation monitoring means connected for comparing the values, at successive instants, of a parameter dependent on wheel speed, and for producing at least one wheel speed tendency signal based on such comparison; and signal processing means connected for producing selected supplemental control signals influencing the brake pressure in a predetermined manner, in response to the appearance of such a speed tendency indication wherein said variation monitoring means are arranged to produce a wheel speed increase tendency signal in response to a parameter value comparison indicating a tendency of the wheel speed to increase, said signal processing means are arranged to produce a first supplemental control signal serving to prevent brake pressure reduction in response to the presence of the wheel speed increase tendency signal, and said signal processing means are arranged to cause the first supplemental control signal to have an influence serving to maintain the brake pressure constant.

4,077,676
VEHICLE LOAD RESPONSIVE BRAKE PRESSURE CONTROL DEVICE

Yasuhisa Hata, Kobe, Japan, assignor to The Nippon Air Brake Co., Ltd., Kobe, Japan

Filed Mar. 24, 1977, Ser. No. 780,797
Claims priority, application Japan, Apr. 8, 1976, 51/39901
Int. Cl.² B60T *8/22*
U.S. Cl. 303—22 A **8 Claims**



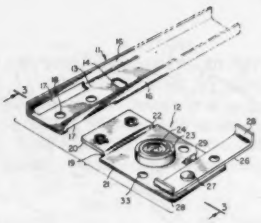
1. A vehicle load responsive brake pressure control device for controlling actuating fluid pressure delivered to braking apparatus of a vehicle equipped with air springs, said control device comprising:
a. first diaphragm means subjectable to prevailing air spring fluid pressure for exerting a first diaphragm force in one direction commensurate with the air spring pressure;
b. self-lapping valve means actuable by said first diaphragm force for effecting delivery of actuating braking pressure to the braking apparatus at a pressure according to the air spring pressure;
c. second diaphragm means operably connected to said valve means and subjectable to said actuating braking pressure for exerting a second diaphragm force on said valve means in opposition to said first diaphragm force for operating the valve means to a lapped condition upon balancing of the two opposing forces;
d. a pair of opposingly disposed and compressibly adjustable springs, one of said springs providing a first spring force acting in opposition to said first diaphragm force and the other spring providing a second spring force acting in opposition to said second diaphragm force;
e. fulcrum lever means through which said first and second spring forces are transmitted to said first and second diaphragm means for opposing said first and second diaphragm forces; and
f. means for varying the moment arm of said fulcrum lever

means for effecting a certain ratio between said first and second diaphragm forces and consequently a corresponding ratio of said braking pressure to said air spring pressure.

4,077,677
DRAWER SLIDE ASSEMBLY

Michael Sekerich, Spring Valley, N.Y., assignor to Buildex, Inc., West Nyack, N.Y.

Filed May 26, 1976, Ser. No. 690,223
Int. Cl.² F16C *17/00, 29/02*
U.S. Cl. 308—3.6 **6 Claims**

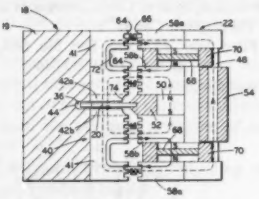


1. A drawer slide assembly comprising a longitudinally extending channel shaped track member including a cross web and side webs extending along and projecting forwardly from the longitudinal side edges of said cross web, one of said side webs having a recess formed therein proximate an end thereof and adjacent to and along said cross web, said cross web being substantially continuous from end to end, a transversely extending mounting plate projecting through said recess and overlying and secured to the front face of said cross web and a roller mounted on the front face of said mounting plate and transversely offset from said track member.

4,077,678
ENERGY STORAGE APPARATUS

Philip A. Studer, Silver Spring, and Harold E. Evans, Beltsville, both of Md., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jul. 30, 1976, Ser. No. 710,035
Int. Cl.² F16C *39/00*
U.S. Cl. 308—10 **14 Claims**

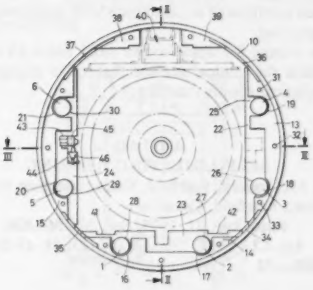


1. An energy storage apparatus comprising:
a stator;
a flywheel rotor including a spokeless, continuous ring portion, and a plurality of salient pole members distributed along an inner rim of said ring portion, a first air gap being formed between opposed pairs of said pole members;
said flywheel rotor being rotatable around an outer rim of said stator, a second air gap being formed between said stator and said rotor;
stationary armature means extending into said first air gap;
means for supplying alternating current to said armature means in a motor mode of operation, said alternating current interacting with magnetic flux in said first air gap to cause rotation of said rotor;
means for withdrawing alternating current from said armature means in a generator mode of operation; and
magnetic bearing means for magnetically supporting said rotor in axial and radial alignment to said stator, including;
first permanent magnet means incorporated in said stator for establishing a steady state flux in said second air gap, and
sets of opposed salient teeth within said rotor and said stator, respectively, said steady state flux passing through said second air gap between said opposed salient teeth for maintaining said rotor and said stator in axial alignment to one another.

4,077,679
ROTARY DRUM FOR ROTARY AUTOCLAVE

Hermann Stock, Neumunster, Germany, assignor to Hermann Stock, Neumunster, Germany

Filed Jul. 1, 1976, Ser. No. 701,970
Claims priority, application Germany, Jul. 10, 1975, 7521855[U]
Int. Cl.² F16C *19/00*
U.S. Cl. 308—8 **16 Claims**



1. A rotary drum for use in a rotary autoclave, comprising
a plurality of parallel axially elongated side members which are angularly spaced apart around and extend along an imaginary cylindrical surface in parallel relation with the axis thereof, and each having a first and a second end spaced apart in the axial direction of the imaginary cylindrical surface,
end-connecting means extending transversely of the axial direction of the imaginary cylindrical surface connecting said first ends of said side members,
shaft-coupling means provided on said end-connecting means and concentric with the axis of said imaginary cylindrical surface,
at least one integral bearing race surrounding said side members and spaced apart from said first end-connecting means in the axial direction of the imaginary cylindrical surface, and
second connecting means detachably connecting said bearing race to said side members.

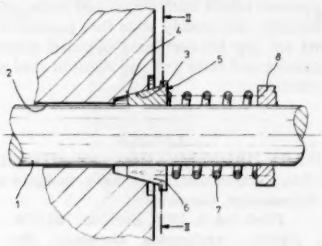
4,077,680
SHAFT MOUNTING APPARATUS

Karl Ashauer, Wolfsburg, and Klaus Sendzik, Lehre, both of Germany, assignors to Volkswagenwerk Aktiengesellschaft, Germany

Filed Oct. 14, 1976, Ser. No. 732,460
Claims priority, application Germany, Dec. 11, 1975, 2555644
Int. Cl.² F16C *25/00*
U.S. Cl. 308—70 **5 Claims**

1. In apparatus for mounting an extended shaft to a support structure, said shaft being subjected to a selected range of excitation frequencies and having a natural resonant vibra-

tional frequency, said apparatus comprising at least one bearing supporting said shaft arranged between said structure and said shaft, and having bearing play; a internal support surface on said structure concentric to said shaft; and means, permanently resilient in all radial directions, mounted between said shaft and said support surface, for shifting the resonant frequency of said shaft to a frequency above said frequency range,



the improvement wherein said support surface is conical and said frequency shifting means includes:

a ring arranged concentric to said shaft and having a conical surface configured to cooperate with said conical support surface, and

resilient means for applying an axial force to said ring to maintain the conical surface thereof in engagement with said conical support surface.

4,077,681

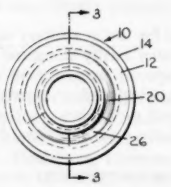
SELF-ADJUSTING BEARING

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Inc., Fairfield, Conn.

Filed Apr. 21, 1975, Ser. No. 569,836

Int. Cl.[2] F16C *9/06, 23/04, 25/04, 43/02*

U.S. Cl. 308—72 **6 Claims**



1. A spherical bearing assembly having an inner race member and an outer race member, the inner surface of the outer race member being a concave spherical surface, the outer surface of the inner member being a complementary convex spherical surface, the inner member including a spool member having a first threaded portion disposed on its outer surface and at least two spherical segments, each segment having a second threaded portion on its inner surface complementary to said first threaded portion on the outer surface of said spool member, said segments disposed on and interlocked with said spool member by the meshing of said complementary first and second threaded portions, said spool member's axial length is somewhat greater than the axial length of said bore such that said spool member, when threaded in a meshing relationship with said spherical segments, a portion of said threaded spool will extend beyond the lateral faces defined by the spherical segments, said extension of said spool member being adapted to receive a threaded nut-like member to further lock said spool member and said spherical segments in their respective operational position, the improvement comprising the provision of a conical recess on said nut member on the side thereof abutting said spherical segments, the angle of said conical surface of said recess being substantiall, tangential to the outer convex spherical surface of said inner member, whereby the conical surface radially and longitudinally inwardly grips the segments and holds the segments aligned with each other and in tight inward relationship on the spool member independent of the outer member.

4,077,682

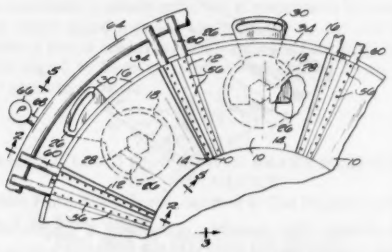
LARGE THRUST BEARING WITH LUBRICATION IN THE SPACES BETWEEN PADS

Willis W. Gardner, Waukesha, Wis., assignor to Waukesha Bearings Corporation, Waukesha, Wis.

Filed Aug. 24, 1976, Ser. No. 717,298

Int. Cl.[2] F16C *17/06*

U.S. Cl. 308—160 **11 Claims**



1. In a thrust bearing having a plurality of bearing pads which are supported in circumferentially spaced relationship on a circular retainer, and having a runner which is rotatably relative to the faces of the pads, the improvement comprising at least some of said pads having radial edges exposed to spaces between adjacent pads and having main oil ducts along said edges, oil jet ducts communicating with each main duct and having outer ends positioned to direct jets of oil against a portion of said runner in the spaces between the faces of adjacent pads, manifold means outwardly of peripheral portions of the pads and having an oil conduit therein, means connecting each main duct of a pad with the oil conduit of said manifold means, and means for supplying oil under pressure to said manifold conduit.

4,077,683

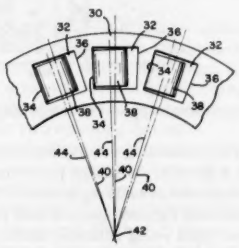
ROLLER THRUST BEARING CAGE AND ROLLER ASSEMBLY

Chander Prakash Bhateja, Harwinton, and Richard Lassen Alling, Torrington, both of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Mar. 22, 1976, Ser. No. 669,400

Int. Cl.[2] F16C *33/46*

U.S. Cl. 308—235 **3 Claims**



1. An annular roller thrust bearing cage and roller assembly for use in a thrust bearing comprising: an annular cage having a plurality of circumferentially spaced roller pockets, and a

cylindrical roller located in at least one of the pockets; the shape and dimensions and location of each pocket and the shape and dimensions of each roller being such that running clearance exists between the roller and the lateral walls of the pocket and each roller pocket having at least one pocket lateral wall constructed and located so that as the thrust bearing begins to rotate in a predetermined direction the cylindrical roller contacts said at least one pocket lateral wall, in guided radial alignment and the extended center line of the cylindrical roller always passes through the axis of the annular cage as the thrust bearing continues to rotate in such predetermined direction.

4,077,684

STOP DEVICE FOR SLIDING COMPARTMENTS DISPOSED SIDE BY SIDE

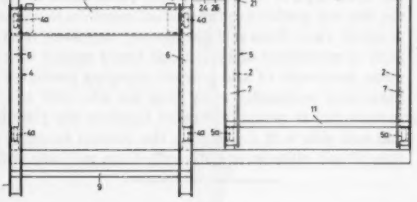
Kurt Scherrer, Munsingen, Switzerland, assignor to U. Scharer Sohne AG, (USM), Munsingen, Switzerland

Filed Sep. 22, 1976, Ser. No. 725,544

Claims priority, application Switzerland, Oct. 1, 1975, 122744/75

Int. Cl.[2] E05C *7/06*

U.S. Cl. 312—220 **2 Claims**



1. A stop device for sliding compartments disposed side by side in a supporting structure, comprising:

a base plate for mounting between two adjacent said compartments,

two interlockable pivoting members disposed on said base plate and respectively associated with said two compartments,

two control beaks respectively projecting from said pivoting members into the sliding paths of said associated comparts,

two catches respectively projecting from said pivoting members toward said associated compartments and being situated in or out of the sliding paths of said compartments depending upon the pivoting positions of said pivoting members, and

locking means disposed between said pivoting members and actuable by said control beaks.

4,077,685

COMBINATION CUTTING BOARD AND DRAWER

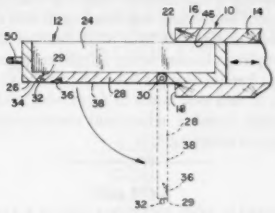
Ronald Scire, and Felicetta Scire, both of 145 Alder Dr., Kings Park, N.Y. 11754

Filed Nov. 2, 1976, Ser. No. 738,035

Int. Cl.[2] A61B *19/02*

U.S. Cl. 312—246 **4 Claims**

1. In combination a cutting board including a main board structure and a cutting surface, for slicing or chopping food material, and a drawer removably, slidingly insertable into said main board structure, said drawer being adapted to have the



dual capacity of acting as storage means and dispensing means for the prepared food material.

4,077,686

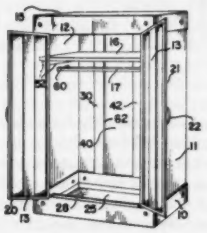
PREFABRICATED METAL STORAGE CABINETS

Finley M. Bukaitz, Clifton, N.J., assignor to Kero Metal Products Co., Inc., Carlstadt, N.J.

Filed Jan. 10, 1977, Ser. No. 757,972

Int. Cl.[2] A47B *87/00*

U.S. Cl. 312—257 SM **9 Claims**



1. A prefabricated box-like storage module of the type having a closed bottom surface, a closed top surface, a back wall located between said top and bottom surfaces and first and second side walls relatively perpendicular to said back wall with an open front between said top and bottom surfaces and opposite said back wall, comprising:

a. top and bottom box-like housing members each having two opposite side walls of relatively equal length and two additional side walls perpendicular to said opposite side walls, each of relatively equal length to the other, said top and bottom members having a closed surface located between said side walls of relatively the same area and an open end, each member having a peripheral slot about said opened end with said slot located about both said opposite side walls and at least along one of said additional side walls,

b. a "U" shaped composite member having a right extending arm and a left extending arm relatively equal to the length of said opposite side walls with the central arm of said "U" located between said extending arms relatively equal to the length of said additional side walls, said composite "U" shaped member having one end located within said slot of said bottom housing member and said other end located within said slot of said top housing member to thereby provide a box-like storage module, said "U" shaped composite member further having at least one continuous coupling channel directed between said top and bottom housings for coupling at least a first predetermined planar portion of said "U" shaped configuration to another predetermined portion to form said composite "U" shaped member as positioned between said top and bottom housings, said "U" shaped member comprising a

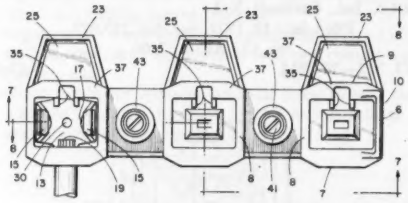
right side wall section of an "L" shaped configuration having a continuous coupling channel along one edge thereof, a left side wall section of an "L" shaped configuration having a continuous coupling channel along one edge thereof and facing said channel in said right side wall and at least one planar back wall member having a right sided coupling channel along a right edge and a left sided coupling channel along a left edge, for coaction with said channels in said side walls to form with said side walls, a "U" shaped member when said corresponding coupling channels are coacting.

4,077,687

STAB ASSEMBLY FOR VERTICAL BUS BARS PLUG-ON UNIT

Samir F. Farag, Peru, Ind., assignor to Square D Company, Park Ridge, Ill.

Continuation of Ser. No. 490,645, Jul. 22, 1974, abandoned.
This application Aug. 27, 1975, Ser. No. 608,316
Int. Cl.² H01R *13/62*
U.S. Cl. 339—64 M **11 Claims**



1. An electrical stab assembly for a plug-on unit comprising an insulated molded base member, a cap member mounted thereon, floatable seating means provided by said base member and cap member, contact jaw means associated therewith and mounted in said seating means for limited reciprocal movement to move axially with bus bars to which said jaw means are connected as said bus bars move axially in one direction a first pre-determined distance due to thermal expansion and back in the opposite direction the same pre-determined distance when current flow decreases permitting said bus bars to cool and thus contract, the dimension of said seating means which corresponds to the directions of said axial movement being greater than the corresponding dimension of said jaw means seated therein by at least the amount of said first pre-determined distance to permit such jaw means to move axially therein freely and together with said bus bars.

4,077,688

ZERO FORCE CONNECTOR FOR CIRCUIT BOARDS

Robert Franklin Cobaugh, Elizabethtown, and James Ray Coller, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 560,856, March 21, 1975, abandoned.
This application Oct. 8, 1976, Ser. No. 730,880
Int. Cl.² H01R *13/62*; H05K *1/07*
U.S. Cl. 339—74 R **29 Claims**

1. A circuit board connector comprising:

an insulating rectangular housing having a base and first and second side walls mounted vertically thereon and substantially parallel to each other and open along one edge to form a passageway between said first and second side walls for edgewise insertion of a circuit board provided with contacts adjacent said open edge,

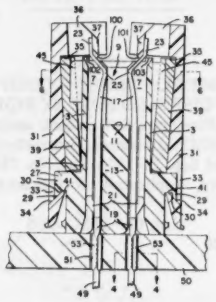
stop wall means within the passageway spaced from said open edge of the housing and forming a stop for the edge of said circuit board,

at least one row of elongated resilient laterally spaced contact members each having a first portion of its length secured within the housing and a free end portion extending beyond the stop wall means toward the open edge of the housing,

said contact members being provided with a contact area intermediate said portions which is normally located in the path of movement of a circuit board in said passageway,

a plate lever positioned outside said housing side walls and along the length thereof,

cooperating means on said plate lever and one of said side walls of the housing for pivotally supporting said plate lever on the side wall for movement toward and away therefrom,



said plate lever having a contact engaging portion overlying the open edge of the housing and constructed to capture the free end portions of the contact members to retract the contacts away from said passageway and away from said path of movement of said circuit board against their bias upon movement of said contact engaging portion of said plate lever outwardly away from the side wall, and

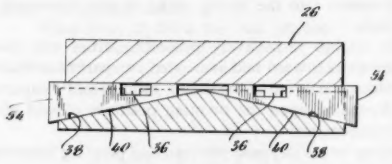
actuating means movably located between the plate lever and said side wall for moving the contact engaging portion of said plate lever outwardly from said side wall.

4,077,689

CIRCUIT PACKAGE RECEPTACLE WITH INTEGRAL SEPARATION MEANS

Leonard H. Feldberg, Spring Valley, N.Y., assignor to Burndy Corporation, Norwalk, Conn.

Filed Apr. 25, 1977, Ser. No. 790,644
Int. Cl.² H01R *13/54*; H05K *1/10*
U.S. Cl. 339—75 M **16 Claims**



1. An electrical connector receptacle for effecting electrical interconnection with a circuit component which has a multiplicity of contact members that project a substantially the same direction from said circuit component, comprising

at least one peripheral edge,

an upper support surface to which said component is to be juxtaposed when said component is in normal use with said contact members electrically interconnected with corresponding members in said receptacle,

a base having at least one upward facing inclined plane within said receptacle, which slopes downward in the direction of said receptacle,

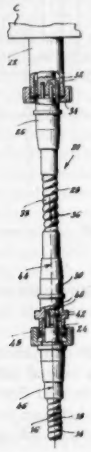
and a cam member juxtaposed to said inclined plane, and having an upper surface, the uppermost portions of which are configured correspondingly to the uppermost portions of said support surface so as cooperatively therewith to present a unified contact surface to a circuit component positioned thereon, and also having a downward facing inclined plane forming its lower surface substantially corresponding in slope to and shorter in length than the corresponding inclined plane in the base of the receptacle to which it is to be juxtaposed.

4,077,690

SAFETY DEVICE FOR ELECTRICALLY AND MECHANICALLY COUPLING A TEMPERATURE-SENSING PROBE TO A TIMING COMPUTER

Bernard G. Koether, Westport, Conn., assignor to Food Automation-Service Techniques, Inc., Stratford, Conn.

Filed Sep. 27, 1976, Ser. No. 726,850
Int. Cl.² G01K 7/22; H01R 13/54
U.S. Cl. 339—89 R **9 Claims**



1. In a cooking system wherein the cooking is to be controlled by an electrical control unit, such as a timing computer, responsive to a temperature sensed by a probe assembly containing a temperature-sensitive element delivering electrical signals to the timing computer through a flexible conduit, the improvement which comprises:

a probe safety coupling device for electrically and mechanically coupling the probe assembly to said control unit,

the probe safety coupling device including:

a first electrical connector fixedly secured to the computer,

a flexible conduit joined to the first electrical connector, and

a second electrical connector axially releasably joining the flexible conduit of the probe assembly to the flexible conduit of the coupling device with their longitudinal axes in alignment, and arranged to release upon the imposition of axial tension,

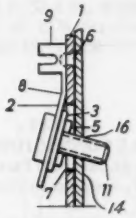
whereby bending strain upon the second electrical connector is reduced to thereby improve electrical contact, and whereby relative movement between said probe assembly and said control unit is converted to an axial stress upon the second electrical connector resulting in separation of the coupling device from the probe assembly without breakage.

4,077,691

CONTACT DEVICE

Kjell Gustaf Roland Hagermo, Skarholmen, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Aug. 2, 1976, Ser. No. 710,913
Claims priority, application Sweden, Sep. 5, 1975, 7509869
Int. Cl.² H01R 9/10
U.S. Cl. 339—95 R **4 Claims**



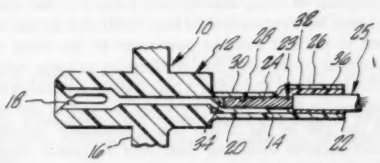
1. A contact assemblage comprising: a metallic object; a metallic plate abutting said metallic object; a connection plate having a first portion parallel with and fixed to a portion of said metallic plate and a second portion integrally connected to said first portion and extending at an angle away from said metallic plate, said connection plate having a protrusion projecting from said second portion, said protrusion having a first hole formed centrally thereof and a plurality of ribs extending radially outwardly from said first hole, said protrusion and said ribs extending toward said metallic plate, said metallic plate having a second hole formed therethrough in alignment with said first hole formed in said protrusion, said second hole being of a larger diameter than the diameter of said protrusion so that a portion of said protrusion and a portion of said ribs extend partially into said second hole before operative connection between said ribs and said metallic object; and means for alternately bending said second portion of said connection plate toward said metallic plate and said metallic object in order to align said first and second portions, whereby upon bending of said second portion by said means said ribs extend through said second hole and abut against said metallic object to make electrical contact therewith.

4,077,692

INTEGRALLY FORMED CONNECTOR

Roger M. Ellis, Atherton, Calif., and Werner M. Allgaier, Westerham, Germany, assignors to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 644,588, Dec. 29, 1975, abandoned.
This application Apr. 8, 1977, Ser. No. 786,120
Int. Cl.² H01R 13/58
U.S. Cl. 339—103 M **5 Claims**



1. An electrical connector comprising a connector body, said connector body including a connector head and a conductor termination portion extending from said connector head, said conductor termination portion including a termination support member and a closure member, said termination support member and said closure member extending coextensively from said connector head and being mutually contiguous along substantially parallel lines, said closure member having arched portions between said substantially parallel lines to form con-

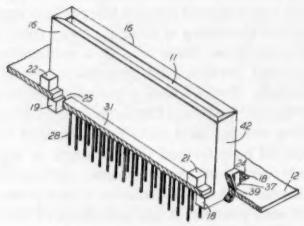
ductor termination cavities, at least said arched portions of said closure member being heat recoverable and said termination support member being not heat recoverable, said termination support member having a wall thickness of at least twice the wall thickness of the heat recoverable portion of said closure member, said heat recoverable portion of said closure member being recoverable to constrict each said conductor termination cavity upon the application of heat.

4,077,693

PANEL-MOUNTABLE CONNECTOR BLOCK ASSEMBLY

Henry Christian Briel, Jr., Rochelle Park, and Julius Alan Sabo, Colonia, both of N.J., assignors to Western Electric Co., Inc., New York, N.Y.

Filed Dec. 8, 1976, Ser. No. 748,801
Int. Cl.[2] H05K *1/06, 1/10*
U.S. Cl. 339—126 R 4 Claims



1. A connector block assembly comprising:

a connector block capable of being inserted through a cutout in a panel having an upper and a lower surface to locate portions of the block on both surfaces of the panel;

protrusions extending from the block into interfering relationship with the panel to limit insertion of the block through the cutout to a predetermined depth;

lugs extending from the block, the lugs being spaced in conforming relationship with notches in the panel along the periphery of the cutout to permit the lugs to be inserted through the panel, the inserted portion of the block having a length in the plane of the panel which is less than that of the cutout to permit a movement of the block in the direction of the length of the cutout upon the block being inserted therethrough, the lugs upon such movement being located in interfering relationship with the panel to prevent extraction of the block from the panel; and

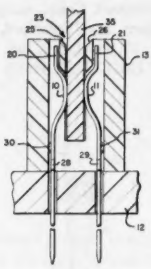
a key capable of being inserted into a space in the plane of the panel between an end of the cutout and an end of the block to prevent a return movement of the block and a movement of the lugs into conforming position with the notches, the key including a base having a predetermined thickness to fill the space between the end of the cutout and the end of the block, and a resiliently deformable center section including two cam members slopingly extending from opposite edges of the base in an increasing height about and toward the center of the base, the two cam members terminating in detenting surfaces facing each other and being spaced from each other by an amount equal to the thickness of the panel, the cam members being interconnected by a bridging link located within the space defined by the thickness of the base, the link being flexible to permit at least one of the cam members to be resiliently depressed into the space defined by the thickness of the base.

4,077,694

CIRCUIT BOARD CONNECTOR

Robert Franklin Cobaugh, Elizabethtown, and James Ray Coller, Mechanicsburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 589,971, Jun. 24, 1975, abandoned, which is a continuation of Ser. No. 445,736, Feb. 25, 1974, abandoned, which is a continuation-in-part of Ser. No. 439,501, Feb. 4, 1974, abandoned, which is a continuation-in-part of Ser. No. 407,402, Oct. 17, 1973, abandoned. This application May 4, 1976, Ser. No. 682,921
Int. Cl.[2] H05K *1/07*
U.S. Cl. 339—176 MP 11 Claims



6. A combination of a connector means and a first substrate for connecting said first substrate to a second substrate and comprising:

a row of contacts each comprising first and second ends joined together by a bowed portion and with said first emds being secured in said first substrate, and having a protuberance formed between the bowed portion and said first end and extending outwardly from said pair of contacts;

each of said contacts positioned with the convex side of said bowed portions facing in the same direction and in alignment;

a detachable housing means constructed to be pressed over said contacts while said contacts are secured in said first substrate and comprising:

first and second side walls;

the first of said side walls constructed to press against said protuberances to increase the effective length of securement of said first ends of said contacts and to force said contacts towards the other wall of said detachable housing means;

holding elements constructed and positioned to force the second ends of said contacts back towards said first side wall;

means for securing said holding elements to one of said side walls; and

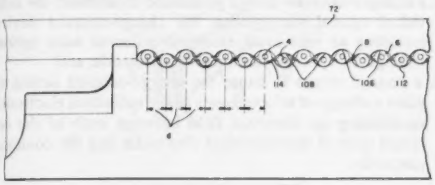
a first slot formed between said side walls to enable entry of said second substrate therein and into contact with the convex sides of said bowed portions of said contacts;

said detachable housing means further constructed to be retained in its position over said pairs of contacts by frictional engagement between said detachable housing means and said contacts, and to be removable from said first substrate without receiving said contacts from said first substrate.

4,077,695
TERMINATION MEANS FOR RIBBON CABLES

Johannes Cornelis Wilhelmus Bakermans, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 666,552, Mar. 15, 1976, Pat. No. 4,005,518. This application Dec. 10, 1976, Ser. No. 749,656
Int. Cl.² H01R 9/08, 43/04
U.S. Cl. 339—176 MF 9 Claims



1. A conductor positioning means which is intended for use with flat cable of the type comprising a plurality of parallel substantially co-planar conductors which are contained in continuous insulating material, said conductors being spaced-apart by a nominal spacing *d* said positioning means comprising:

a plate-like member having cable engaging surface which is entended to be positioned against said cable with said surface extending across said cable and transversely of the axes of said parallel conductors,

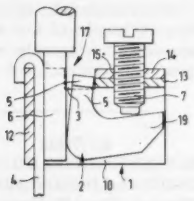
side-by-side parallel flutes extending across said cable engaging surface, said flutes being spaced-apart on center lines which extend normally of said surface by said distance *d*, each of said flutes having a center of curvature and having a radius of curvature, said centers of curvature of alternate ones of said flutes being offset with respect to the centers of curvature of the remaining flutes, whereby

upon pressing a section of said cable against said cable engaging surface, said insulating material will be distorted and said conductors will be positioned on said center-lines so that the said conductors assume a zig-zag pattern as viewed in cross section with the distance between adjacent conductors, as measured in the direction of the original plane of said cable, being said nominal spacing *d*.

4,077,696
ELECTRICAL TERMINAL

Gottfried Glaesel, Minusio, Switzerland, assignor to Hego Electric GmbH, Glarus, Switzerland

Filed Apr. 26, 1976, Ser. No. 680,410
Int. Cl.² H01R 11/26
U.S. Cl. 339—266 R 4 Claims

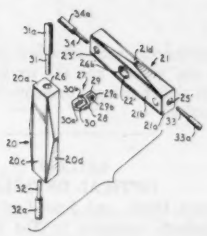


1. An electrical terminal comprising a U-section body of bent sheet metal and having a transverse member extending transversely to the limbs and base of the U, a clamping screw having a screw tip threaded in the said transverse member and extending generally parallel to the base of the U and between the limbs thereof, and a generally L-shaped claimping member loosely located in the body between the limbs thereof and having a first arm laterally spaced from a clamping surface in the body generally parallel to the screw and a second arm disposed to be engaged by the screw tip, the said first arm having at its end an external surface tiltably engaging a portion of the body, the body providing access for insertion of a conductor between the said first arm and the clamping surface whereby on tightening of the clamping screw the inserted conductor can be clamped in the body.

4,077,697
WIRE CONNECTING DEVICES

Curtis D. Yates, 10617 E. 53rd St., Raytown, Mo. 64133

Filed Apr. 19, 1976, Ser. No. 678,058
Int. Cl.² H01R 7/06
U.S. Cl. 339—274 13 Claims



1. Means for electrically connecting a plurality of electrically conducting wires comprising, in combination,

a pair of elongate, wire receiving members of electrically insulating material, and

a connector member of electrically conducting material,

each said elongate, wire receiving member having at least one, substantially flat side extending substantially parallel to the longitudinal axis thereof,

each said wire receiving member having a like cylindrical bore extending into the said flat side thereof at substantial right angles to the longitudinal axis thereof, said bore positioned intermediate of the ends and sides of said member and stopping short in its depth of the opposite side of the member, and

an elongate passageway extending substantially axially of each said elongate wire receiving member from one end thereof into said bore,

said connector member comprising a pair of perforated plates each fixed one to the other at one end thereof,

said plates each rectangular in form, of a length substantially equal to the depth of the bores in the wire receiving members, and a width substantially equal to the internal diameter of said bores,

said perforated plates oriented at right angles to one another and adapted to simultaneously fit into and slidingly engage the walls of the respective bores in said members with the flat sides of said members in facing contact with one another.

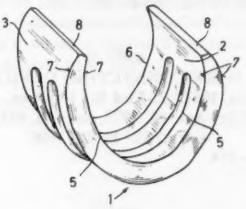
4,077,698
CONDUCTOR, CLAW, AND METHOD AND APPARATUS FOR ITS PRODUCTION

Alfred Könnemann, and Rudolf Reinertz, both of Wuppertal, Germany, assignors to Grote & Hartmann, Wuppertal, Germany

Filed Dec. 8, 1976, Ser. No. 748,544
Claims priority, application Germany, Dec. 11, 1975, 2555709
Int. Cl.² H01R 5/08
U.S. Cl. 339—276 R 8 Claims

1. A conductor claw, comprising a bent bottom section, claw arms adjoining the bent bottom section at the two ends thereof, the conductor claw having two inwards bends, one bend being located at the junction between one end of the bent bottom section and the adjoining claw arm, the other bend being located at the junction between the other end of the bent

bottom section and the adjoining claw arm, the end sections of the claw arms being curved, each curved claw arm end section having an inner radius of curvature and an outer radius of



curvature equal thereto, each claw arm including intermediate its respective end section and the respective inward bend a straight section which merges tangentially into the respective curved end section.

4,077,699
OPTICAL DEVICES

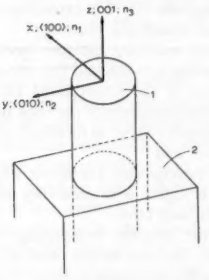
Richard Burnaby Dyott, and John Leslie Stevenson, both of London, England, assignors to The Post Office, London, England

Filed Sep. 18, 1975, Ser. No. 614,764

Claims priority, application United Kingdom, Sep. 24, 1974, 41598/74

Int. Cl.² G02B 5/14

U.S. Cl. 350—96.34 **11 Claims**



8. An optical mixer comprising a length of intrinsic dielectric optical waveguide having a single crystal cylindrical core of a material having a non-centro-symmetric crystal structure and a cladding, and optical input means for coupling two distinct optical signals into said length of dielectric optical waveguide.

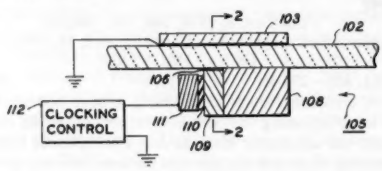
4,077,700
WAVEGUIDE ADDRESSING AND MODULATING METHOD AND APPARATUS

Don L. Camphausen, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 26, 1976, Ser. No. 745,277

Int. Cl.² G02B 5/14; H01L 79/78

U.S. Cl. 350—96.13 **4 Claims**



1. A device for individually addressing and modulating light propagating through selected ones of a plurality of optical waveguides, the device comprising:

a. a common electrode;

b. a plurality of individual optical waveguides having light propagating therethrough arranged adjacent the common electrode, the waveguides being formed from a material which modulates the propagating light responsive to an electrical field;

c. a charged-coupled device positioned to intersect the individual optical waveguides, the charge-coupled device including an individual electrode adjacent each optical waveguide opposite the common electrode; and

d. a control means to cause the charge-coupled device to place a charge at selected ones of the individual electrodes establishing an electrical field between each of the selected ones of the individual electrodes and the common electrode.

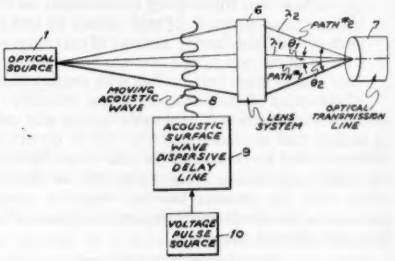
4,077,701
METHOD AND ARRANGEMENTS FOR DISPERSION EQUALIZATION OF OPTICAL FIBER TRANSMISSION LINES

Peter Dennis Steensma, Midland Park, N.J., and Charles Kuen Kao, Roanoke, Va., assignors to International Telephone and Telegraph Corporation, Nutley, N.J.

Filed Jun. 2, 1976, Ser. No. 692,063

Int. Cl.² G02B 5/14; G02F 1/11

U.S. Cl. 350—96.23 **26 Claims**



1. A method of equalizing dispersion effects in an optical fiber transmission line having a given delay characteristic for each optical wavelength propagated therethrough comprising the step of:

producing a predetermined delay characteristic by an optical delay means disposed adjacent an input of said optical fiber transmission line for each wavelength of an optical beam having a finite bandwidth which is the inverse to said given delay characteristic of said transmission line, each of said wavelengths of said optical beam in said optical delay means having only one narrow range of selected angles with the axis of said optical fiber transmission line.

4,077,702
SPLICING ELEMENT FOR CONNECTION OF INDIVIDUAL LIGHT WAVEGUIDES

Dieter Kunze, Neuried; Horst-Wolfgang Wolf, Munich, and Richard Parstorfer, Germering, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Jun. 22, 1976, Ser. No. 698,785

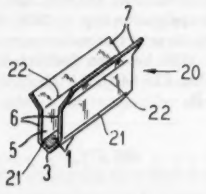
Claims priority, application Germany, Jul. 21, 1975, 7523185[U]; Jul. 21, 1975, 7523186[U]

Int. Cl.² G02B 5/14

U.S. Cl. 350—96.21 **8 Claims**

1. A splicing element for undetachably connecting an end of one light waveguide to an end of another light waveguide in a light transmitting relationship, comprising a single member having a pair of thin wall portions, each portion of said pair

having a surface inclined to the surface of the other portion of the pair at an actute angle to form a centering groove having a V-shape and extending longitudinally in said member for receiving and positioning the ends of the light waveguides to be connected together, said pair of wall portions having first



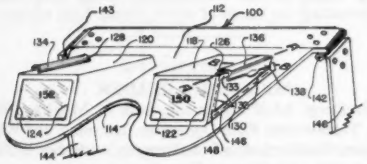
extensions extending parallel to each other and terminating in second longitudinal extensions which diverge outwardly so that the first extension forms an aligning groove adjacent the centering groove and said second extension forms an insertion aid to facilitate insertion of the waveguides into the aligning groove and then into the centering groove.

4,077,703

OPTICAL APPARATUS FOR VIEWING OBJECTS AT AN ANGLE TO THE DIRECT LINE OF VISION

Cecilia P. M. Pablo, 1822 W. Eddy, Chicago, Ill. 60657

Filed Jul. 19, 1976, Ser. No. 706,238
Int. Cl.[2] G02B *27/02*
U.S. Cl. 350—145 **6 Claims**



1. Optical apparatus for enabling a person wearing such apparatus to view objects at an angle to their direct line of vision while their gaze is fixed in a substantially direct line of vision comprising an eye frame positionable over the eyes of a person wearing such apparatus, said eye frame having eye openings therein, nose receiving means on said eye frame for positioning said eye frame over the bridge of the nose of a person wearing such apparatus, prism housing means mounted on said frame over eye openings for removably housing optical prisms therein, prism access openings in said prism housing means for removably inserting optical prisms into said prism housing means, lockable cover means for opening and closing said openings and for securing an optical prism in said prism housing means and a prism located in said prism housing means.

4,077,704

REPRODUCING OBJECTIVE FOR VIDEO DISKS

Toshimichi Koizumi, Sagamihara, and Miwako Unami, Yokohama, both of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Sep. 20, 1976, Ser. No. 724,767
Claims priority, application Japan, Sep. 25, 1975, 50-115811
Int. Cl.[2] G02B *9/60*
U.S. Cl. 350—218 **6 Claims**

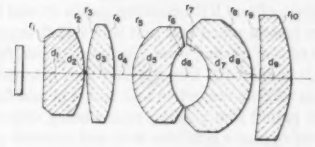
1. A reproducing objective for video disks comprising a first, second, third, fourth and fifth lenses, said first lens being a positive lens, said second lens being a positive lens, said third lens being a negative meniscus lens with its convex surface positioned toward the object side, said fourth lens being a negative meniscus lens with its concave surface positioned toward the object side, said fifth lens being a positive meniscus lens with its concave surface positioned toward the object side, said reproducing objective for video disks satisfying the following conditions:

1. $0.30 \Delta r_6/f \geqq 0.23$

2. $0.38 \geqq d_1/f \geqq 0.26$

3. $1.4 \geqq r_6/|r_7| \geqq 0.9$

4. $6.0 \geqq |f_3|/|f_4| \geqq 2.5$



5. $0.31 \geqq d_5/f \geqq 0.21$

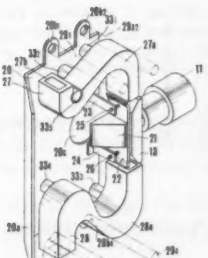
wherein referemce symbol f represents the focal length of the lens system as a whole, reference symbol f_3 represents the focal length of the third lens, reference symbol f_4 represents the focal length of the fourth lens, reference symbol r_6 represents the radius of curvature of the surface on the image side of the third lens, reference symbol r_7 represents the radius of curvature of the surface on the object side of the fourth lens, reference symbol d_1 represents the thickness of the first lens and reference symbol d_5 represents the thickness of the third lens.

4,077,705

MOTION PICTURE PROJECTION APPARATUS

Kuniyoshi Suzaki, Machida, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 472,416, May 22, 1974, abandoned.
This application Oct. 22, 1975, Ser. No. 624,895
Claims priority, application Japan, May 25, 1973, 48-58931
Int. Cl.[2] G03B *23/02*
U.S. Cl. 352—73 **20 Claims**



1. A motion picture projection apparatus capable of alternative use with film stored within a cartridge provided with means for reflecting light to the film and also with film provided on an open supply reel to be wound on an open take-up reel in the projector, said apparatus comprising:

a lens projection system for projecting an image;

light-emitting means for providing illumination to said film for image projection, said means being disposed at a position optically correlated with said lens projection system;

film gate means arranged intermediately between said lens projection system and said light-emitting means so as to be

nearer to said lens projection system than said light-emitting means;

a unit movably mounted in the apparatus, said unit being composed of the following recited means which are subject to simultaneous alternative displacement to a first position for being effectively operative for reel-to-reel operation and to a second position upon insertion of a cartridge in said apparatus for being operationally ineffectual for reel-to-reel operation:

pressure means for bringing a film gate into contact under pressure with a part of said film provided on the open supply reel when said unit is in said first position,

light-reflecting means capable of directing the light coming out of said light-emitting means to said lens projection system when said unit is in said first position, and

a pair of film guiding means for guiding said film from the open supply reel through said film gate means to said open take-up reel when said unit is in said first position, said paired film guiding means being disposed at relatively opposite positions with said pressure means interposed therebetween along the prearranged direction of the running path of said film; the insertion of said cartridge rendering said cartridge operational and moving said unit to said second position, wherein said film stored within said cartridge is permitted to travel toward said film gate means, wherein said refecting means mounted on said cartridge is arranged at the same position as the place where the reflecting means of said unit had been disposed when said unit was in said first position, and further wherein the light coming from said light-emitting means is directed to said lens projection system through said reflecting means of the cartridge.

4,077,706

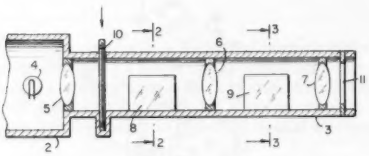
PROJECTING KALEIDOSCOPE

Marshall J. Yaeger, 20 W. 64th St., New York, N.Y. 10023

Filed Dec. 1, 1976, Ser. No. 746,597

Int. Cl.² G03B *21/00*

U.S. Cl. 353—1 **7 Claims**



1. A projecting kaleidoscope, comprising:

a. a housing;

b. projecting lamp means in said housing;

c. means for supporting a design adjacent said lamp means for projection of light therethrough;

d. first and second V-shaped, elongated mirror trough means in said housing and spaced from one another, each trough means having a pair of light-reflecting surfaces facing toward each other; and

e. optical means for providing an optical path from said lamp means through said design and thence through said first and second mirror trough means, said optical means comprising a first lens means adjacent said lamp means and said design supporting means, a second lens means between said first and second mirror trough means and a third lens means after said second mirror trough means.

4,077,707

ILLUMINATION DISTRIBUTION SYSTEM FOR MICRORECORD READER

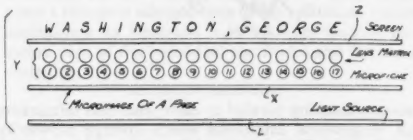
Adnan Waly, Stamford, Conn., assignor to Izon Corporation, Stamford, Conn.

Division of Ser. No. 291,589, Sep. 25, 1972, Pat. No. 4,033,686, which is a division of Ser. No. 135,996, Apr. 21, 1971, Pat. No. 3,704,068. This application Sep. 2, 1976, Ser. No. 719,694

The portion of the term of this patent subsequent to Nov. 28, 1989, has been disclaimed.

Int. Cl.² G03B *23/02, 21/26*

U.S. Cl. 353—27 R **5 Claims**



1. In a microrecord reader in which information is optically extracted from the microrecord by a lens array, the microrecord being constituted by a record medium having a plurality of data sets recorded on the face thereof, each set representing a reduced scale image of a distinct page of intelligence and being dissected into a multiplicity of data sub-sets which are dispersed on the medium; an illumination distribution system comprising a plurality of flexible light-conducting optical fibers each arranged to conduct light from a common source to a respective sub-set, thereby illuminating the sub-sets of the data set from which information is being extracted, the remaining areas of the microrecord being unilluminated, thereby avoiding the waste of the available light energy.

4,077,708

MICROFILM READER

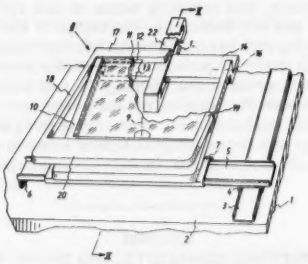
Günter Freiberg; Adolf Koopmann, both of Munich; Günther Lüder, Taufkirchen; Ruth Opperman, Ismaning, and Wilfried Hofmann, Taufkirchen, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sep. 16, 1976, Ser. No. 723,884

Claims priority, application Germany, Sep. 20, 1975, 2542043

Int. Cl.² G03B *21/10, 23/08*

U.S. Cl. 353—27 R **6 Claims**



1. In a microfilm reader having a housing, in combination, a holding frame for holding a microfiche; guide means mounted on the housing and guiding the frame for movement along two perpendicular coordinate axes for moving selected portions of the microfiche held by the frame into position to be projected; and arresting means for arresting the frame in the selected position, the arresting means including a stationary clamped structure on the housing and a cooperating releasable clamping structure on the frame, the clamping structure when not released clamping the clamped structure and thereby arresting the frame relative to the housing, the holding frame defining a

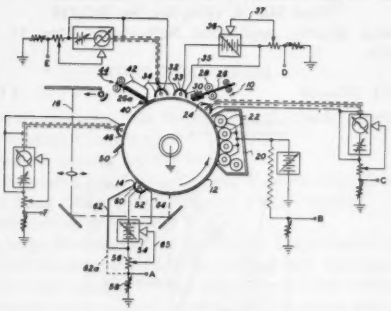
generally rectangular area for accommodating microfiches, each of the two perpendicular coordinate axes extending parallel to a respective one of the sides of the rectangular area, the clamping structure comprising an elongated releasable clamp located to one side of the rectangular area of the holding frame, the elongated clamp extending parallel to such one side and having a length at least approximately as long as such one side, the clamped structure comprising an elongated clamped member extending perpendicular to the elongation of the elongated clamp and clamped by the latter from opposite sides, the clamped member having a length at least approximately as long as one of the sides of the rectangular area parallel thereto.

4,077,709

TRANSFER CHARGE CONTROL SYSTEM

Stephen Borostyan, Victor; Douglas P. Connolly, Webster, and Alan D. Friske, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 26, 1975, Ser. No. 607,746
Int. Cl.² G03G *15/16*
U.S. Cl. 355—3 TR **3 Claims**



1. In an electrostatographic copying apparatus in which imaging material is transferred from an image support surface to overlying variably conductive copy sheets in a transfer station by electrical transfer charges from transfer charging means applied to the copy sheet, and in which electrically conductive copy sheet guide members outside of the transfer station contact the copy sheet while the copy sheet is in the transfer station and thereby can receive variable leakage currents of said transfer charges from said copy sheet, and in which said transfer charging means comprises a transfer corona generator and a high voltage variable current output power supply connected to said corona generator, the improvement wherein:

said transfer charging means includes transfer output control means for varying the output of said transfer charging means,

said conductive members contacting the copy sheet while it is in the transfer station are electrically isolated from electrical ground and are electrically connected to said transfer output control means to vary the output of said transfer charging means in response to said transfer charge leakage currents to said conductive members,

wherein said transfer charging means has a low resistance connection between said power supply and electrical ground, and wherein said conductive members are electrically connected between said low resistance connection and said power supply to hold said conductive members to a voltage level only slightly above electrical ground, and

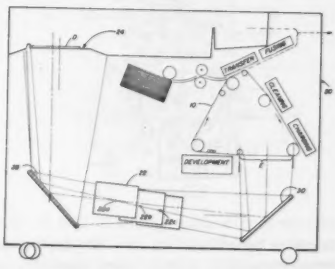
wherein said transfer output control means regulates substantially constant the total output current of said transfer charging means minus said transfer charge leakage current to said conductive members so as to increase the output current of said transfer charging means in response to an increase in said variable leakage current to said conductive members.

4,077,710

LENS SHIFT MECHANISM

John William Ward, Springwater, and Richard Klein Leinbach, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Feb. 3, 1976, Ser. No. 654,819
Int. Cl.² G03G *15/00*
U.S. Cl. 355—3 R **14 Claims**



1. An electrophotographic copier apparatus for making document copies at a plurality of magnifications, said apparatus comprising: a platen for supporting a document to be copied; a moving photoconductor for forming electrostatic latent images; and optical means for projecting an image of a document on said platen to an exposure area on said moving photoconductor, said optical means including a carriage supporting a pancratic lens assembly having at least two relatively movable lens elements, means for moving said carriage along a predetermined path to a plurality of discrete positions for establishing different magnifications at the respective discrete positions, means for longitudinally moving one of said lens elements relative to another of said lens elements as said carriage is moved to establish for said lens elements different optical relationships which correspond respectively to the different magnifications; and means effective upon the establishment of a particular optical relationship corresponding to a particular desired magnification for interconnecting said lens elements for unitary movement to disable said longitudinal moving means, whereby location of said carraige in one of its discrete positions provides a desired one of said magnifications.

4,077,711

ELECTROPHOTOGRAPHIC COPYING APPARATUS OF WET DEVELOPING TYPE

Hiroyuki Akamatsu, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan

Filed May 28, 1975, Ser. No. 581,560
Claims priority, application Japan, May 28, 1974, 49-59901
Int. Cl.² G03G *15/10*
U.S. Cl. 355—10 **8 Claims**

1. An electrophotographic copying apparatus of the wet type in which developing is effected with a developing solution including toner dispersed in a carrier liquid, comprising,

a. photosensor means, having a photosensitive surface, adapted to circulate around a horizontal axis in one direction twice during each copying operation;

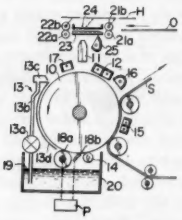
b. an exposure optical system for scanning an original document to produce an electrostatic latent image thereof on said surface;

c. cleaning means disposed beneath said photosensor means and engageable with said surface for removing residual toner therefrom;

d. developing means disposed laterally adjacent said photosensitive surface at a substantially higher level than, and

upstream of, said cleaning means, with respect to the circulating direction of said surface, and operable to direct a flow of said developing solution against said photosensitive surface, for developing said latent image with said solution, with the developing solution flowing downwardly along said photosensitive surface to said cleaning means to serve as a cleansing solution therefor; and

e. transfer-printing means disposed downstream of said cleaning means, with respect to the circulating direction of said surface, for transfer-printing the developed toner image onto copy sheets;



f. said exposure optical system, said developing means and said transfer-printing means being operative, and said cleaning means being retracted from said photosensitive surface during the first circulation of said photosensor means, to produce a copy of the original documents;

g. said exposure optical system and said transfer printing means being inoperative, and said cleaning means being engaged with said photosensitive surface, during the second circulation of said photosensor means, for flushing of some toner from said photosensitive surface by the developing solution supplied by said developing means and removal of the remaining toner by said cleaning means.

4,077,712

WET TYPE DEVELOPING DEVICE FOR USE IN ELECTROPHOTOGRAPHY

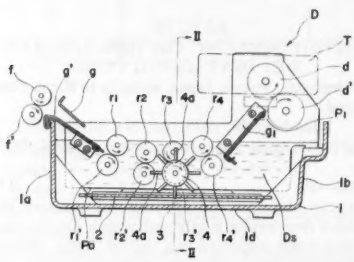
Koji Imaizumi, Aichiken, and Shigemitsu Shimizu, Toyokawa, both of Japan, assignors to Minolta Camera Kabushiki Kaisha, Azuchi, Japan

Filed Nov. 21, 1975, Ser. No. 634,328

Claims priority, application Japan, Dec. 3, 1974, 49-147102[U]

Int. Cl.[2] G03G *15/10*

U.S. Cl. 355—10 **10 Claims**



1. A wet-type electrophotographic developing device for developing an electrostatic latent image on a copy material in a wet developing solution containing toner particles comprising:

a developing tank containing said developing solution therein;

at least one pair of rotatable roller means having a shaft therethrough positioned in said developing tank in said developing solution for contacting and passing said copy material therebetween through said developing solution in said tank and for developing said image on said copy material;

at least one substantially horizontal stirring member in said developing tank adjacent the bottom of said tank beneath said roller means for agitating said developing solution and toner particles in the bottom of said tank at least beneath said roller means; and

at least one pair of engaging members mounted on said shaft through said roller means engaging said stirring member, whereby said stirring member moves in conjunction with the rotation of said shaft through said roller means.

4,077,713

COPYING APPARATUS WITH MOVING BELT FOR TRANSFERRING IMAGES

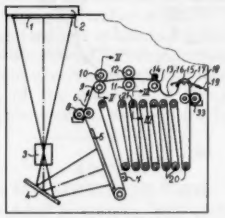
Johannes C. A. Vercoulen, Venlo, Netherlands, assignor to Oce-van der Grinten, N.V., Venlo, Netherlands

Filed Mar. 4, 1976, Ser. No. 663,710

Claims priority, application Netherlands, Mar. 11, 1975, 7502873

Int. Cl.[2] G03G *15/00*

U.S. Cl. 355—16 **5 Claims**

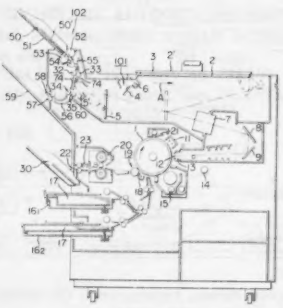


1. In a copying apparatus including an endless belt having an image bearing side comprising a photoconductive layer, means for drawing said belt continuously through at least one imaging station for the formation of an electrostatic or powder image on an area of said layer and then passing the belt to a station for transfer of the image to a receiving material, and a magazine downstream from the transfer station for storing a major portion of the length of said belt so that any area thereof used for the formation and transfer of an image stays in the magazine during at least a minimum rest period before moving again to an imaging station, the improvement which comprises said belt being supported in and transported through the magazine on a multiplicity of rollers freely rotatable about parallel fixed axes and arranged in spaced apart, substantially parallel rows, the length of said belt in said magazine extending in an undulating path through successive direction reversing turns about respective rollers of said rows in alternation so that the image bearing side of the belt bears against rollers of one of said rows and the back side of the belt bears against rollers of the other row, and means upstream of said rollers for maintaining under a preset tension the length of belt that extends through the magazine and from it through said at least one imaging station to said belt drawing means, each of the rollers of said one row being constituted by two narrow roller members which are freely rotatable relative to each other on a common axis and which contact only narrow marginal portions of said belt along its opposite edges; whereby said major portion of the belt length is stored in a compact space without folding or sagging of the belt and without damaging the normal working area of said photoconductive layer.

4,077,714
COPYING APPARATUS

Shigehiro Komori, Yokohama; Hiroyuki Hattori, Naka; Tsuneki Inuzuka, Machida, and Koichi Miyamoto, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 15, 1976, Ser. No. 677,176
Claims priority, application Japan, Apr. 17, 1975, 50-46863
Int. Cl.[2] G03B 27/48, 27/50, 27/70
U.S. Cl. 355—51 3 Claims



1. A copying apparatus for copying either bulky originals or sheet originals comprising:

means for holding a bulky original;

sheet original transporting means, disposed away from said holding means, for transporting a sheet original;

a photosensitive member;

an image forming lens for forming an image on said photosensitive member of a bulky original with light projected from said original holding means along a first optical path and for forming an image of a sheet original on said photosensitive member with light projected along a second optical path;

scanning means for scanning a bulky original positioned on said original holding means including at least two movable mirror means which define the first optical path, wherein at least one of said mirror means intersects and blocks the second optical path during scanning of a bulky original as it moves along an imaginary line which extends at an angle with respect to the second optical path and which has a length sufficient for complete scanning of a bulky original, and wherein said one mirror means is movable along an extension of the imaginary line out of the second optical path to permit the formation of an image on said photosensitive member of a sheet original transported by said transporting means with light projected along the second optical path; and

processing means for forming a copy from the image of an original formed on said photosensitive member.

4,077,715
ADJUSTABLE OPTICAL CAM

Robert I. Greene, Rochester, N.Y., assignor to Itek Corporation, Lexington, Mass.

Filed Feb. 18, 1977, Ser. No. 769,998
Int. Cl.[2] G03B 27/38, 27/70
U.S. Cl. 355—57 8 Claims

1. A variable magnification optical system comprising:

A. object bearing surface means, image receiving surface means and mirror surface means, at least one of said surface means being relatively moveable;

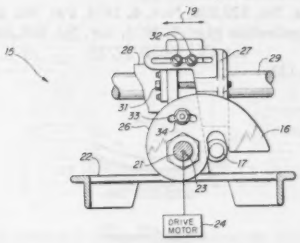
B. imaging lens means for projecting an image of an object onto said image receiving surface means from said object bearing surface means; and

C. positioning means for positioning said moveable surface means to maintain said image in focus at any desired magnification, said positioning means comprising:

a. cam means having a camming surface;

b. follower means cooperating with said camming surface, said follower means being coupled to said moveable surface means;

c. means for moving said cam means relative to said follower means to position said follower means at a location of said camming surface corresponding to said desired magnification, said follower means moving said moveable surface means to a position to maintain said image in focus at said desired magnification; and

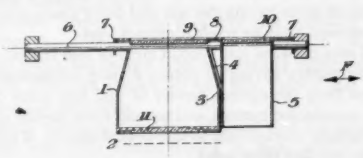


d. adjustment means for adjusting the orientation of said camming surface relative to said follower means to compensate for any variations in focal length of said imaging lens means.

4,077,716
ILLUMINATING EQUIPMENT FOR A PHOTOGRAPHIC ENLARGING OR COPYING APPARATUS

Mario Gandini, Brixen, Italy, assignor to Durst Ag. Fabrik Fototechnischer, Bolzano-Bozen, Italy

Filed Sep. 21, 1976, Ser. No. 725,255
Claims priority, application Italy, Sep. 22, 1975, 4844 A/75
Int. Cl.[2] G03B 27/54
U.S. Cl. 355—67 11 Claims



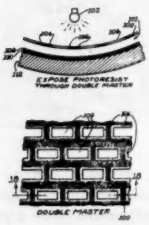
1. An illuminating device for photographic enlarging and copying apparatus having an optical axis comprising a pair of lighting compartments including a first and a second compartment, the first compartment being mounted on the optical axis, the second compartment movably mounted for movement between a position outside the first compartment remote from the optical axis to a position disposed upon it, the first compartment having a first predetermined cross-sectional shape and size for providing advantageous illumination for a first format to be illuminated, the first compartment being large enough to receive the second compartment within it when the second compartment is disposed on the optical axis, the second compartment having a second predetermined cross-sectional shape and size for providing advantageous illumination for a second format to be illuminated, the first compartment having a separate wall section disposed adjacent the second compartment and attached to it, slide means mounting the second compartment and connected wall section of the first compartment, whereby either the first compartment is operatively disposed on the optical axis or the second compartment is operatively disposed on the optical axis within the first compartment, and the second compartment being constructed and arranged to

move through the space provided when the separate wall section of the first compartment is slid within the first compartment.

4,077,717
APPARATUS FOR MAKING A COLOR SELECTION MASK FOR A COLOR CATHODE RAY TUBE

Howard G. Lange, Prospect Heights, Ill., assignor to Zenith Radio Corporation, Glenview, Ill.

Division of Ser. No. 520,836, Nov. 4, 1974, Pat. No. 3,955,980.
This application Mar. 9, 1976, Ser. No. 665,209
Int. Cl.² G03B 27/28
U.S. Cl. 355—133 **3 Claims**



1. For use in the manufacture of a color cathode ray tube color selection mask, a master for use in producing an illumination pattern on an electrically conductive mask blank having a photoresist coating thereon, said master comprising:

a rigid, transparent substrate;

a first preselected pattern on said substrate having a preselected optical density, said first pattern having first areas corresponding in distribution to the pattern of apertures to be formed in the mask blank, at least a predetermined group of said first areas being smaller in size than the desired ultimate mask aperture size, and

a second preselected pattern on said substrate having second areas surrounding said first areas, at least a predetermined group of said second areas corresponding to said first group of areas having the size and outer configuration of the desired ultimate mask apertures, and

a third area between said second areas of said second preselected pattern having an optical density substantially different from the optical density of said first areas of said first preselected pattern, said second areas having an optical density intermediate to said optical density of said first areas and said third areas,

said first and second patterns being such as to effectively establish, upon exposure of the photoresist coating through the master, a first image corresponding to said first pattern and a second image corresponding to said second pattern, said first and second images being capable of being separately developed in separate photoresist development operations.

4,077,718
RECEIVER FOR OPTICAL RADAR

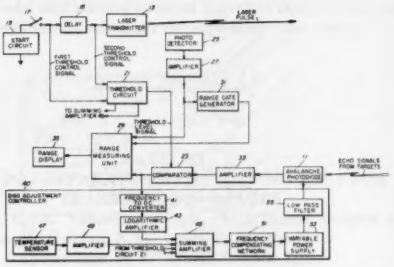
Robert T. Graham, Jr., Wilmington; Robert M. Stevens, Littleton, both of Mass., and Kenneth F. Kinnard, Morristown, N.J., assignors to Raytheon Company, Lexington, Mass.

Filed Mar. 1, 1976, Ser. No. 662,393
Int. Cl.² G01C 3/08
U.S. Cl. 356—4 **2 Claims**

1. In a pulsed optical radar wherein the bias voltage across an avalanche photodiode is adjusted, for a predetermined interval of time following transmission of each interrogating pulse of optical energy, substantially to inhibit the generation of noise impulses and wherein an adaptive biasing arrangement for the avalanche photodiode maintains such photodiode in an optimum condition for the detection of echo signals, such arrangement comprising:

a. a variable power supply for providing a bias voltage, such supply being connected across the avalanche diode;

b. pulse generating means, responsive for an interval of time prior to transmission of each interrogating pulse of optical energy to a train of noise impulses out of the avalanche photodiode, for generating a corresponding train of substantially equal pulses;



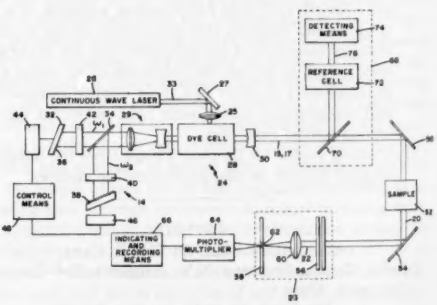
c. conversion means, responsive to the corresponding train of substantially equal pulses, for generating a DC signal having a level proportional to the frequency of the corresponding train of substantially equal pulses; and

d. control means for the variable power supply, such control means being responsive to the DC control signal to reduce the frequency of the noise impulses out of the avalanche photodiode to a predetermined level during the predetermined interval of time following transmission of each interrogating pulse of optical energy.

4,077,719
CONTINUOUS WAVE GENERATION OF COHERENT VIBRATIONAL ANTI-STOKES SPECTRA

Joseph J. Barrett, Morris Plains, and Richard F. Begley, Boonton, both of N.J., assignors to Allied Chemical Corporation, Morris Township, N.J.

Continuation of Ser. No. 569,893, Apr. 21, 1975, abandoned.
This application Dec. 22, 1976, Ser. No. 753,028
Int. Cl.² G01J 3/44
U.S. Cl. 356—75 **16 Claims**



1. Apparatus for spectroscopic material analysis, comprising:

a. radiation source means for generating two coherent, continuous beams of low power monochromatic radiation;

b. tuning means for adjusting the frequency difference between said beams of radiation to equal substantially the vibrational frequency of a preselected constituent of material;

c. projecting means for directing said beams of radiation through said material to produce scattered radiation con-

taining a detectable signal composed of an anti-Stokes component generated coherently during scattering;

d. filtering means adapted to receive said scattered radiation and selectively transmit said signal; and

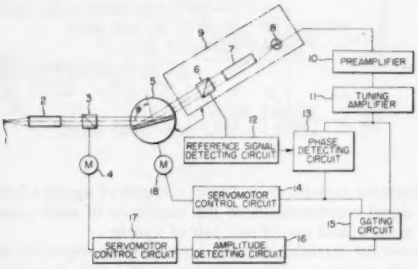
e. detecting means for indicating the intensity of said signal.

4,077,720

SPECTROSCOPIC AUTO ELLIPSOMETER

Toshiyuki Kasai, Matsudo, Japan, assignor to Nippon Kogaku K.K., Tokyo, Japan

Filed Sep. 10, 1976, Ser. No. 722,107
Claims priority, application Japan, Sep. 26, 1975, 50-115644
Int. Cl.[2] G01N *21/40*
U.S. Cl. 356—118 6 Claims



1. A spectroscopic auto ellipsometer for measuring two variables of polarized light (principal angle of incidence Φ and amplitude-reflection ratio angle Ψ) by using the principal angle of incidence method, comprising:

an illumination optical system;

a polarizer set to a predetermined azimuth and mounted for rotation with respect to the optical axis of said illumination optical system·

a table supporting thereon a sample and rotatably mounted for varying the angle of incidence at which linearly polarized light passed through said polarizer impinges on said sample;

an analyser rotatable at a predetermined angular velocity on the reflection optical axis from said sample;

photoelectric converter means for converting the intensity of light emergent from said analyser into electrical signal;

holder means holding said analyser and said photoelectric converter means integrally with each other and operatively associated with said sample supporting table so as to be rotated about the center of rotation of said sample supporting table through an angle of $\pm 2\theta$ for rotation of said sample supporting table through an angle of $\pm\ \theta$;

reference signal generating means for generating, during rotation of said analyser, a reference signal at at least one of $\pm 90°$ azimuths on the Poincare's sphere with respect to the predetermined azimuth of said polarizer;

first control means for comparing the output of said photoelectric converter means with the reference signal from said reference signal generating means and for rotating said sample supporting table until the maximum or the minimum value of said output from said photoelectric converter means is coincident with said reference signal; and

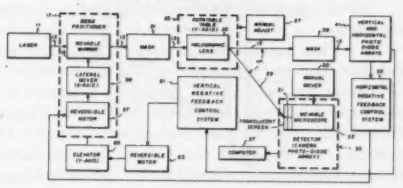
second control means operable after completion of the control by said first control means to rotate said polarizer from its predetermined azimuth until the output of said photoelectric converter means assumes a predetermined constant value.

4,077,721

APPARATUS FOR MEASURING HOLOGRAPHIC LENS ABERRATION PARAMETERS

Windell N. Mohon, Winter Park, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 19, 1976, Ser. No. 715,740
Int. Cl.[2] G01B *9/00*
U.S. Cl. 356—124 20 Claims



1. An apparatus for measuring parameters that are analogous to aberrations in an energy diffraction means, comprising in combination:

means for generating and projecting a predetermined energy having a predetermined wavelength;

first mask means spatially disposed from said predetermined energy generating and projecting means and in the path of the energy projected thereby for masking predetermined portions thereof in accordance with a first masking pattern;

rotatable means spatially disposed from said first masking means for mounting an energy diffraction means in the path of the energy passed therethrough in such manner that a portion of the energy received by said energy diffraction means will be diffracted in accordance with the diffraction grating thereof;

second mask means spatially disposed from said rotatable energy diffraction means mounting means and in the path of the energy not diffracted by said energy diffraction means for the aligning thereof in accordance with a second masking pattern;

semi-clear screen means movably and spatially disposed from the aforesaid mounting means in such manner that the diffracted energy from said energy diffraction means will obliquely impact on one side thereof and partially pass therethrough;

detector means contiguously disposed with the other side of said semi-clear screen means in such manner as to be responsive to and centered upon that portion of said diffracted energy which passes therethrough; and

means effectively positioned with respect to the location where said energy passes through the aforesaid energy diffraction means and the location on said screen where said energy obliquely impacts thereon for indicating the X, Y, Z axes distances therebetween, respectively.

4,077,722

PRECISION BLOCKING OF LENS BLANKS

Bela Joseph Bicskei, 7 Hemenway Rd., Framingham, Mass. 01701

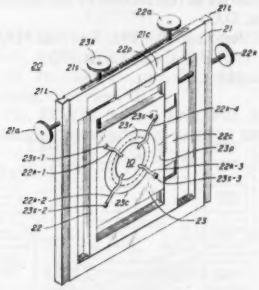
Filed Feb. 12, 1976, Ser. No. 657,455
Int. Cl.[2] G01B *9/00*
U.S. Cl. 356—127 10 Claims

1. The method of calibrating a lens member which comprises the steps of:

a. inserting a lens blank into a first portion of a holder which is adjustable with respect to a second portion thereof;

b. adjusting the first portion of the holder relative to the

second portion thereof in order to align the lens in accordance with a prescribed optical criterion; and



c. de-positioning the lens blank thus adjusted by a prescribed amount by moving said first portion relative to said second portion.

4,077,723
METHOD OF MEASURING THICKNESS

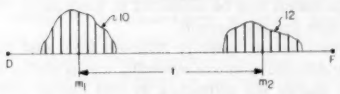
Robert Alfred Pirlet, Embourg, Belgium, assignor to Centre de Recherches Metallurgiques-Centrum voor Research de Metallurgie, Brussels, Belgium

Filed Oct. 22, 1975, Ser. No. 624,838

Claims priority, application Belgium, Oct. 24, 1974, 821452; May 28, 1975, 829619

Int. Cl.² G01B *11/02, 11/00*

U.S. Cl. 356—163 **2 Claims**



1. A method of measuring a dimension of a body, the method comprising: directing a beam of optical rays towards each of two points on the surface of the body at opposite sides of the body; forming rays reflected from the said points into two distinct reflected beams; directing the reflected beams towards a common plane by means of an optical system which causes the two resulting images to follow respective lines, two rows of photodiodes being arranged along the two respective lines; subjecting both rows of photodiodes to continuous and synchronized electronic scanning; starting a time counter when the scanning of one row of photodiodes detects the middle of the illumination caused by an image; and stopping the counter when the scanning of the other row of photodiodes detects the middle of the illumination caused by the other image, the time interval registered by the counter being representative of the said dimension.

4,077,724
OPTICAL DENSITY MEASUREMENT

Ronald Briggs, Knebworth, England, assignor to National Research Development Corporation, London, England

Continuation of Ser. No. 438,275, Jan. 31, 1974, abandoned. This application Oct. 30, 1975, Ser. No. 627,452

Claims priority, application United Kingdom, Feb. 9, 1973, 6598/73

Int. Cl.² G01N *21/06*

U.S. Cl. 356—208 **2 Claims**

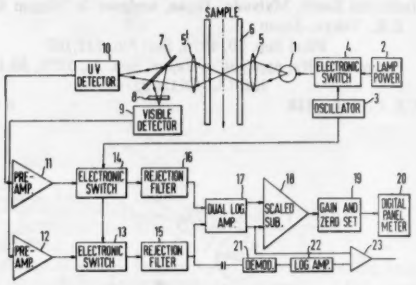
1. A device for use in monitoring pollution of liquids, comprising:

means for directing a beam of light having both visible and ultraviolet components through a flowing sample of liquid;

a pair of photoelectric detectors respectively arranged to detect visible and ultraviolet components of the light from said beam which has been transmitted through said sample and to produce outputs which respectively vary as functions of the detected components;

means for modulating said beam of light;

means for demodulating said outputs of said detectors to provide a pair of signals;



means for deriving from one of said pair of signals a further signal representative of the amplitude of noise components in said one of said pair of signals;

means for obtaining the difference between respective logarithmically amplified versions of said pair of signals to provide a measure of the organic content of said sample; and

means for obtaining the difference between respective logarithmically amplified versions of said further signal and said one of said pair of signals to provide a measure of the amount of solid suspended matter in said sample.

4,077,725
SHOE POLISH APPLICATOR

Ernest G. Slautterback, 215 St. David Dr., Mt. Laurel, N.J. 08057

Filed May 27, 1976, Ser. No. 690,565

Int. Cl.² B43K *27/10, 5/14, 29/00*

U.S. Cl. 401—17 **4 Claims**

1. A shoe polish applicator comprising a reusable holder having an elongated handle portion and a generally disk-shaped head portion at one end of said handle portion; and a disposable applicator pad removably supported by said head portion; said pad comprising a resilient and generally disk-shaped body of porous material impregnated with a paste shoe polish, a relatively rigid non-porous backing member secured to said body, and a protective wrapper extending over said

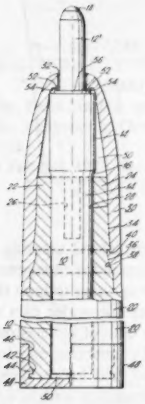
resilient body to seal the polish therein; and connecting means provided by said head portion embracing said relatively rigid backing member for releasably holding said pad in place; said protective wrapper including a tear strip extending about the periphery of said pad along a line spaced from said backing member and said connecting means for tearing said wrapper to expose the polish-impregnated body of said pad without causing said polish to contact said holder or the fingers of a user; said protective wrapper extending about said body and said backing member to completely enclose said pad, whereby, said protective wrapper is interposed between said head portion and said backing member, and between said connecting means and the surfaces of said body and backing member, when said pad is supported by said holder.

4,077,726

GRIP-LOCK PEN

nil Hechtle, Mountainside, N.J., assignor to Radiant Pen Corporation, Kenilworth, N.J.

Filed Jun. 16, 1976, Ser. No. 696,505
Int. Cl.² B43K *7/00*
U.S. Cl. 401—209 **6 Claims**



1. A pen body for substantially enclosing a completely assembled, self contained ball-point cartridge to form a writing instrument, comprising a plastic barrel, the end of the barrel provided with means for preventing the cartrige from inward movement with respect to the barrel during the writing position, and a collar tightly compressing the outside of the end of the barrel, said barrel and collar means having an opening through which the writing tip of said ball-point cartridge extends, said collar means enclosing and having complementary interlocking means for securing the collar to the barrel preventing expansion of the barrel end, and provided with means for retaining the cartridge writing tip of said ball-point in outward position.

4,077,727

BALL PEN INK CARTRIDGES CONTAINING INKS WHICH DO NOT FORM CRYSTALLINE MASSES WITHIN COPPER OR COPPER ALLOYS

Steven H. Kramer; Glenn F. Roquemore, both of Escondido, and James J. Joyce, Saratoga, all of Calif., assignors to Gordon S. Lacy, Escondido, Calif.

Division of Ser. No. 325,721, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 231,701, Mar. 3, 1972, abandoned. This application Feb. 19, 1975, Ser. No. 550,921
Int. Cl.² B43K *7/10*
U.S. Cl. 401—215 **10 Claims**

1. A ball pen ink cartridge comprising a nib and a body, at least one of which includes copper or copper alloy, and which cartridge permits air and moisture to enter into contact with ball pen ink contained within said cartridge, where said ball pen ink consists essentially of:

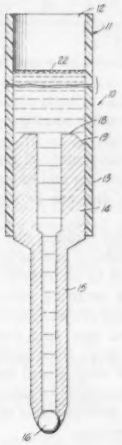
(a) liquid polar organic carrier, about 30–70 weight percent;

(b) carrier soluble fatty acid having 4–20 carbon atoms, about 1–25 weight percent;

(c) about 5–50 weight percent of carrier soluble resin selected from the class consisting of coal tar, coumarone, coumarone-indene, phenol-modified-coumarone, phenol-modified-coumarone-indene, hexanetriol phthalate resin, ketone condensate, ketone-aldehyde condensate, pine tar, polyvinylpyrrolidone, zein, and mixtures thereof;

(d) dye, pigment, or mixtures thereof, in an amount suitable for producing the desired colored line; and

(e) carrier soluble additive from the class of (1) antioxidants, (2) corrosion inhibitors, and (3) mixtures thereof where said (1) antioxidants are selected from the group consisting of octylated diphenylamine, isopropoxy diphenylamine, condensate of acetone and diphenylamine, aldol-alpha-naphthylamine, · phenylbeta-naphthylamine-isopropoxy, phenyl-beta-naphthylamine, diaryl-para-phenylene diamine, alkylaryl-para-diphenylene diamine, 2,2-methylene-bis-(4-ethyl-6-tertiary butyl phenol), 2,2-methylene-bis-(4-methyl-6-tertiary butyl phenol), 2,6-ditertiary butyl-4-methyl phenol, styrenated phenol, hindered phenol, polymeric hindered phenol, lauryl-paraaminophenol, stea-



ryl-para-aminophenol, N-acetyl-para-aminophenol, N-butyryl-para-phenol, 2,2-thiobis-(4-methyl-6-tertiary butyl phenol), 1,1-thiobis-(2-naphthol), hydroquinone, 2,5-ditertiary butylhydroquinone, 2,5-ditertiary amylhydroquinone, monotertiary butylhydroquinone, hydroquinone monomethyl ether, hydroquinone monobenzyl ether, octadecyl-3-(-3',5'-dittertiary butyl-4') hydroxyphenyl propionate, dilauryl thiopropionate, ditertiary butylthiodipropionate, butylated hydroxyanisole, 4-dodecyloxy-2-hydroxybenzophenone, and polymerized trimethyl dihydroquinoline,

and said (2) corrosion inhibitors are selected from the group consisting of sorbitan fatty acid ester, trimer acid, nonylphenoxy acetic acid, N,N'-disalicylol-1,2-propanediamine, bis (octylphenyl)hydrogen phosphatediethylamine, octylphenyl dihydrogen phosphate diethylamine, mixtures of said diethylamine salts, mercaptobenzothiazole, and sodium-2-mercaptobenzothiazole, and mixtures thereof,

where said antioxidant, when present, is present, in an amount of 0.5–10 weight percent,

where said corrosion inhibitor, when present, is present in an amount of about 0.1–5 weight percent, and

said weight percents of antioxidant and corrosion inhibitor

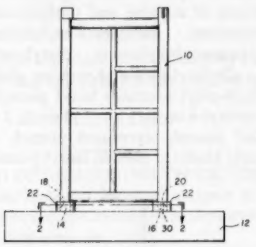
are based on the weight of the ink components: carrier, fatty acid, resin, dye and pigment,

whereby the formation of ink-flow-preventing crystalline mass in said cartridge is prevented as a result of entering oxygen and moisture which react with ink components and with the copper or copper alloy to form said crystalline mass, in the absence of said additive.

4,077,728
DISTORTION OF PLASTIC PARTS ALIGNS NON-COAXIAL MEMBERS

Norman A. Wrigglesworth, Williamsville, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.

Filed Feb. 7, 1977, Ser. No. 766,255
Int. Cl.[2] F16B *7/04, 9/02*
U.S. Cl. 403—186 **3 Claims**



1. Structure for releasably securing male and female plastic parts together comprising:

a female part preferably molded out of plastic material of low dimensional stability and having a pair of spaced apart openings having a distance between the centers thereof; and

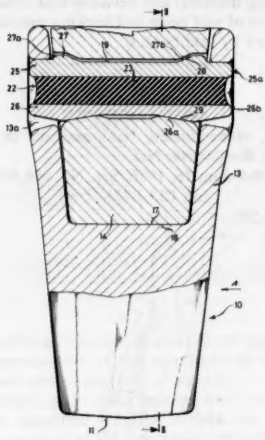
a male part preferably molded out of a plastic material of low dimensional stability and having a pair of spaced apart projections adapted to be inserted into said pair of openings for releasably securing said female and male parts together, one of said projections having a pair of radially extending, opposed ears, said opening being adapted to deform toward or away from each other for allowing said projections to seat within said openings even if the distance between the centers of said projections varies from part to part and is different than said distance between the centers of said openings.

4,077,729
HOLDING CONSTRUCTION FOR DETACHABLE CONNECTION OF THE TOOTH TIP OF A DREDGE TOOTH

Dieter Schwappach, Dortmund, Germany, assignor to O & K Orenstein & Koppel Aktiengesellschaft, Dortmund, Germany

Filed Oct. 20, 1976, Ser. No. 734,276
Claims priority, application Germany, Oct. 21, 1975, 2547019
Int. Cl.[2] F16B *19/00*
U.S. Cl. 403—379 **3 Claims**

1. A holding construction for use in connection with a digging implement, which includes: a holder for connection to a digging implement, a tooth tip comprising a cutting edge and a sleeve-shaped section having said holder arranged therein, said holder having a holder opening with the approximate cross section of a trapezoid having its parallel sides extending substantially parallel to said cutting edge while the longitudinal substantially central plane of the holder opening substantially coincides with the longitudinal central plane of said holder, a connecting member extending through said holder opening and detachably engaging said sleeve-shaped section of said tooth tip while comprising a wider metallic section and a narrower metallic section and a compressible elastomeric element interposed between and connected to said two metallic sections, said connecting member extending substantially parallel to said cutting edge and normally having its narrower metallic section in engagement with that side of said holder opening which is adjacent thereto and when viewing said holder opening in cross section forms the shorter one of said two parallel sides of said trapezoid, the wall sections defining the sides of the holder opening and connecting the wider section of the holder opening with the narrower section thereof having tapering sections tapering toward said narrower sections thereof, and the wider metallic sections of said



connecting member having lateral tapering sections tapering toward the elastomeric element for engagement with the tapering sections of said holder opening to limit the compression of the elastomeric element by the wider part of the connecting member within the elastic limit of the elastomeric element, the two metallic parts of said connecting member being provided with first cam means and said holder being provided with second cam means for cooperation with said first cam means to limit the compression of said elastomeric element within the elastic limit thereof when knocking said connecting member out of said holder for exchanging said holder.

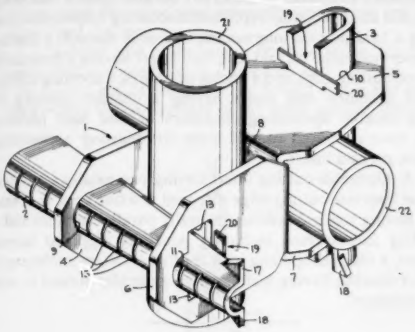
4,077,730
COUPLING FOR TUBULAR SCAFFOLDING

Joseph Maurice Zaidan, P.O. Box 2217, Farra Bldg., Riad Solh St., Beirut, Lebanon

Continuation-in-part of Ser. No. 399,156, Sept. 20, 1973, Pat. No. 3,861,816. This application Sep. 5, 1974, Ser. No. 503,495
Int. Cl.[2] F16B *7/00*
U.S. Cl. 403—385 **12 Claims**

1. A coupling for scaffolding comprising a central link, two pairs of arms projecting from the link, each arm having an aperture therein, and each pair of arms being adapted to embrace a respective scaffolding member, and a pair of wedges, each being generally U-shaped in transverse cross-section, each wedge being adapted to project through the apertures in a respective one of said pairs of arms and arranged so that the free edges of the U-shaped cross-section bear upon and retain in position an embraced scaffolding member, each wedge being provided with a pair of stop members to resist withdrawal of said wedge from said respective apertures and each

wedge having a plurality of notches in the bottom of the U-shaped cross-section, said notches being arranged to bear



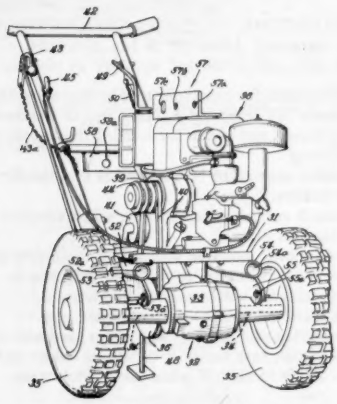
against said arms thereby locking said wedges within said apertures in said arms.

4,077,731

REINFORCING WIRE LAYING MACHINES AND ATTACHMENTS

Orville H. Holz, Sr., Palm Harbor, and Norbert J. Holz, Spring Hill, both of Fla., assignors to Orville H. Holz, Jr., Roselle, Ill., a part interest

Filed Feb. 18, 1975, Ser. No. 550,364
Int. Cl.[2] E01C *19/00*
U.S. Cl. 404—83 **56 Claims**



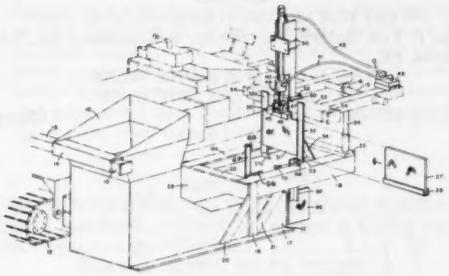
1. An apparatus for use by concrete contractors comprising:
a transaxle device having a power input, an axle housing, two ends and axles extending from each of said ends;
ground wheels respectively mounted on said axles;
a main frame including an engine and two generally horizontal supports, each support being between the central part of the housing and a respective end of the housing, said supports extending transversely to the housing and each having a first part extending to one side of said housing and a second part facing in the direction of the opposite side of said housing, said second part of said supports including an attachment mounting means, said supports being secured to the housing, said engine being mounted on said first parts of said supports;
drive means connecting said engine and said power input; and
an attachment positioned at said opposite side of said housing and including a device connected to said mounting means.

4,077,732

INSERTION OF COMPRESSIBLE SHEETS IN CONCRETE

Terry David Koch, Telford, Pa., assignor to Inno-Cept Corporation, Lansdale, Pa.

Division of Ser. No. 710,714, Aug. 2, 1976, Pat. No. 4,049,359.
This application Jan. 11, 1977, Ser. No. 758,481
Int. Cl.[2] E01C *23/02*
U.S. Cl. 404—87 **3 Claims**



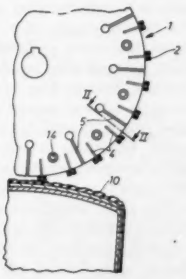
1. Apparatus for inserting a compressible sheet of material into a newly laid concrete curb which comprises a cross head to bear against and move the sheet downwardly, driving means connected to said cross head to force it downwardly, and a backing which is operatively connected to and is moved downwardly by said driving means in unison with the cross head and which is disposed so the sheet lies against it and is thereby restrained from bending as it enters the concrete, and an embracing means operatively connected to the backing plate for holding the lower edge of the sheet against the backing plate during insertion and which remains in the concrete after its insertion.

4,077,733

DEVICE FOR REMOVING THE WEARING SURFACE OF A TIRE

Kauko Ilmari Immonen, Kirvesniemi, 78800 Varkaus 80, Finland

Filed Nov. 15, 1976, Ser. No. 741,670
Int. Cl.[2] B26D *1/12;* B23D *71/00;* B29H *21/08;* B27G *13/00*
U.S. Cl. 407—52 **2 Claims**



1. A device for removing the wearing surface of a tire, which comprises a disc-shaped cutting member formed of two discs detachably joined to each other, the discs having means defining a groove around the periphery of the cutting member and including a number of tire surface cutting bits disposed in the cutting member groove in spaced relationship around the

member and being held in the cutting member groove by clamping action when the two discs are joined together;

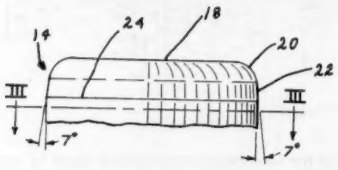
the cutting bits each being formed of at least a partial ring having sharp cutting edges, the bits being held in the cutting member groove with portions of the cutting edges exposed, the exposed cutting edges being adapted to cut tire wearing surfaces upon engagement with a tire rotated relative to the device, the rings including means defining peripheral grooves thereabout, the device further including bit retaining strips fastened to the cutting member and passing around the bits in the bit grooves for additionally retaining the bits in the cutting member peripheral groove.

4,077,734

INSERT FOR MINING TOOLS AND THE LIKE

John F. Kita, Bedford, Pa., assignor to Kennametal Inc., Latrobe, Pa.

Filed Jun. 29, 1976, Ser. No. 700,876
Int. Cl.² B26D *1/00*; E21C *13/00*
U.S. Cl. 407—66 **5 Claims**



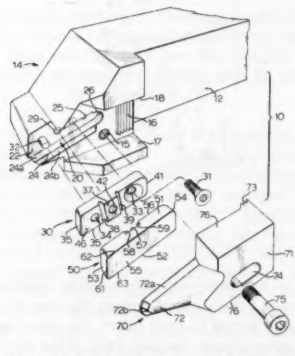
1. An insert, especially for insertion into a blind hole in the body of a mining tool or the like and comprising; a rod-like element having a central longitudinal axis and formed of hard wear resistant material, said insert being substantially cylindrical between the ends thereof and flat on one end and rounded on the other end, said insert adapted for insertion into the hole in the body flat end foremost and with the rounded end protruding from the body, said insert having an axial region near said flat end which tapers inwardly at a predetermined angle toward said flat end, and a rounded peripheral seating region of a predetermined size joining the tapered region to said flat end.

4,077,735

CUTTING TOOL AND INSERT ASSEMBLY

David Cochrane Dick, and Fred Bauer, both of Islington, Canada, assignors to General Electric Company, Schenectady, N.Y.

Filed Oct. 14, 1976, Ser. No. 732,248
Int. Cl.² B26D *1/00*
U.S. Cl. 407—89 **28 Claims**



10. A cutting tool comprising a body having an axially elongated pocket in an end thereof, said pocket being defined by a horizontal base and at least one axially aligned shoulder upstanding therefrom, a replaceable seat having top and bottom surfaces contained in generally parallel planes indexably secured in said pocket by replaceable securing means, said seat having a land portion intermediate the ends thereof, a disposable insert mounted on said seat, said insert having a forwardly disposed cutting edge and a lateral side surface abutting axially aligned shoulder, said insert having a channel opening to closely receive upstanding shoulders of said land portion, clamp means secured to said body for exerting a clamping pressure on said insert.

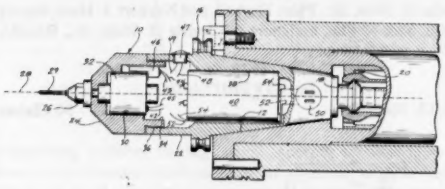
20. A disposable cutting insert having two axially separated ends, at least one cutting edge disposed at a one axial end, said insert having top and bottom generally parallel surfaces and a bounding side surface including generally opposed lateral portions, a channel opening in at least said bottom surface said channel opening having wall portions generally normal to said axial direction.

4,077,736

DRILL SPEEDER FOR MACHINE TOOLS

Morris L. Hutchens, Brookfield, Wis., assignor to Kearney & Trecker Corporation, West Allis, Wis.

Filed Apr. 1, 1977, Ser. No. 783,682
Int. Cl.² B23B *47/06, 49/00*
U.S. Cl. 408—16 **6 Claims**



1. A drill speeder for a machine tool having a spindle, means on said spindle for receiving a toolholder and clamping said toolholder therein, and means for rotating the spindle about its axis, comprising:

a toolholder adapted to be clamped in said spindle and rotated thereby;

a drill chuck rotatably mounted on said toolholder coaxial with the axis thereof;

an electric motor mounted within said toolholder and coupled to said drill chuck to drive the drill chuck;

a battery mounted within said toolholder;

a switch mounted within said toolholder; and

means coupling said battery, said motor, and said switch in series so that said motor is turned on when said switch closes and is turned off when said switch opens.

4,077,737

INTEGRAL HOLE SAW AND ARBOR CONSTRUCTION

Mansfield K. Morse, 1916 Frazer Ave. NW., Canton, Ohio 44709

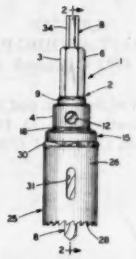
Filed Oct. 18, 1976, Ser. No. 733,334
Int. Cl.² B23B *51/04*
U.S. Cl. 408—206 **3 Claims**

1. Integral hole saw and arbor construction including:

(a) one-piece stem means having an upper shank, an intermediate drive plate and a lower reduced neck, and formed with a central axial bore extending throughout the length of said stem means;

(b) end cap means having an annular configuration with a cylindrical side wall terminating in annular upper and lower end surfaces, a central opening extending axially through said end cap means, and an outer annular shoulder formed at the junction of the lower end surface and cylindrical side wall;

(c) the reduced neck of the stem means being telescopically mounted within the central opening of the end cap means;
(d) a first weld extending between the upper end surface of the cap and the drive plate integrally joining the end cap means and the stem means;
(e) a cylindrical saw blade having first and second circular ends, with saw teeth being formed on said first end;
(f) the second end of the saw blade having a diameter complementary to the diameter of the outer annular shoulder



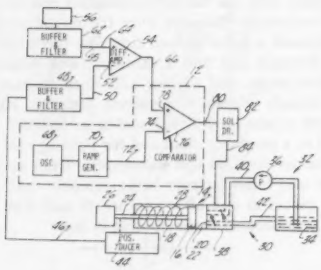
of the end cap means, with said second end of the saw blade being seated within said outer annular shoulder of the end cap means;
(g) a second weld extending between the cylindrical wall of the end cap means and the saw blade integrally joining the end cap means and the saw blade; and
(h) setscrew means threadably mounted on the drive plate and communicating with the axial bore whereby a pilot drill may be adjustably clamped within said bore.

4,077,738

TIME MODULATED POSITION CONTROLLER

W. A. Keely, Highland, and R. Korneffel, Rochester, both of Mich., assignors to Teledyne Industries, Inc., Los Angeles, Calif.

Filed Dec. 29, 1975, Ser. No. 644,572
Int. Cl.[2] F15B *13/16*
U.S. Cl. 415—36 **4 Claims**



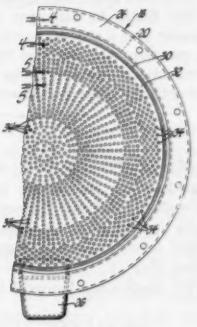
1. A time modulated position controller comprising:
a hydraulic actuator having a cylinder and a piston slidably disposed in said cylinder, said piston defining a chamber within said cylinder,
resilient means for urging said piston in one axial direction,
a source of fluid pressure and valve means operable upon actuation to permit fluid communication from said source of fluid pressure to said cylinder chamber, said valve means also operable upon deactuation to exhaust fluid from said cylinder chamber, and
means for actuating said valve means comprising a transducer operable to generate a signal at its output proportional to the axial position of said piston within said cylinder, a control line connected to a control signal input, said control line and said transducer output being connected to inputs of a differential amplifier which produces an error output signal, and time modulator means for modulating the error output of said differential amplifier to produce an output signal to actuate said valve wherein said time modulator means comprises a fixed frequency oscillator having its output coupled to a ramp generator to generate a ramp output signal at a fixed frequency, a digital comparator which produces an output signal at one voltage level when the ramp output signal exceeds error output signal and which produces an output signal at another voltage level when the error output signal exceeds the ramp output signal, said comparator having one input connected to the error output signal from said differential amplifier and its other input connected to the ramp output signal from said ramp generator and a valve driver having an input coupled to the output from said comparator and an output coupled to said valve means whereby said valve driver actuates said valve means upon receipt of the comparator output signal at one voltage level and deactuates said valve means upon receipt of the comparator output signal at the other voltage level.

4,077,739

ENGINE TURBOCHARGER TURBINE INLET SCREEN

James W. Heilenbach, Riverside, Ill., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 20, 1976, Ser. No. 752,394
Int. Cl.[2] F01D *15/00*; F02B *37/00*
U.S. Cl. 415—121 G **4 Claims**



1. A turbine inlet screen for use with an internal combustion engine having an exhaust gas driven turbine to cover the inlet to such turbine to protect it from potentially damaging particulate matter in the exhaust gases, said screen being adapted to be rigidly secured to an annular edge of support means in a gas flow path defined by a housing with said screen being spaced radially from said housing to permit its thermal expansion relative to said housing, said housing being adapted to be mounted at the inlet to such turbine, said screen comprising a circular metal plate having a solid edge and perforated inwardly of the edge in a pattern extending over substantially the entire remaining surface of said plate, said pattern including spaced central and peripheral portions with at least one intermediate portion therebetween, said peripheral portion having rings of perforations concentric with said edge, said pattern varying in its various portions in the proportion of remaining plate area unoccupied by perforations such that said proportion is greater than the overall plate average in said central portion, smaller than average in said intermediate portion and has in said peripheral portion an increasing value with increasing radius adjacent said edge, whereby the transient heating and cooling rates of the central portion and said edge of the plate are respectively substantially lower than those of said one intermediate portion and of the parts of said peripheral portion inwardly adjacent to said edge.

4,077,740
HELICOPTER ROTOR BLADES

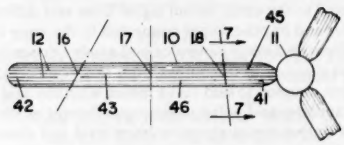
Arnold John Sobey, Hindhead, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

Filed Aug. 3, 1976, Ser. No. 711,371

Claims priority, application United Kingdom, Aug. 6, 1975, 32943/75

Int. Cl.² B64C *27/46*

U.S. Cl. 416—230 **3 Claims**



1. A helicopter rotor blade having a root and extending outward to a tip, an upper surface, a lower surface, a leading edge, a trailing edge, a spanwise neutral flapping plane and a spanwise neutral lagging plane, comprised at least in part of composite material having fibers embedded in a matrix, the fibers extending substantially spanwise of the blade, the blade having:

a first portion extending spanwise adjacent the root wherein fibers lie adjacent said upper and lower surfaces, said fibers at the outward end of said portion being diverted inwardly from said upper and lower surfaces to a position wherein said fibers lie adjacent said spanwise neutral flapping plane; and a second portion extending spanwise from said position wherein said fibers are diverted outwardly from adjacent said spanwise neutral flapping plane to lie adjacent said upper and lower surfaces.

4,077,741
HELICOPTER ROTOR BLADES

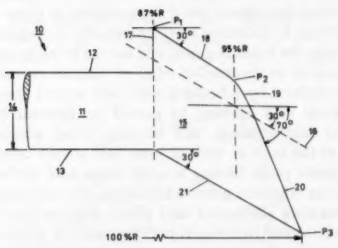
Martin Vincent Lowson, Barton St. David; David Leonard Hawkings; Geoffrey Malcolm Byham, both of Yeovil, and Frederick John Perry, Corton Denham, all of England, assignors to Westland Aircraft Limited, Yeovil, England

Filed May 18, 1976, Ser. No. 687,640

Claims priority, application United Kingdom, May 19, 1975, 21352/75

Int. Cl.² B64C *27/46*

U.S. Cl. 416—228 **18 Claims**



1. In a helicopter rotor blade comprising a root end arranged for attachment to a rotor head for rotation, during operation, about a generally vertical axis and a central portion extending from the root end, and being of aerofoil section having leading and trailing edges and a chord dimension, the improvement comprising a swept tip at the end of the central portion opposite the root end, the swept tip having a leading edge extending initially forwardly from a junction with the leading edge of the central portion to a first point located forward of the leading edge of the central portion, then being swept rearwardly from the first point to a second point, a curved joining portion blending the swept leading edge with a rearwardly swept tip edge of higher sweep magnitude than the swept leading edge and extending to a third point, and a rearwardly swept trailing edge extending from a junction with the trailing edge of the central portion to the third point, the swept tip having a larger chord dimension than the chord dimension of the central portion, an outer area of the tip being progressively reduced in thickness towards the tip edge.

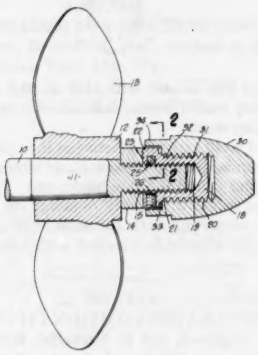
4,077,742
PROPELLER SHAFT ANODIC PROTECTOR KIT

Wendell W. Goodwin, 4702 Coldbrook Ave., Lakewood, Calif. 90713

Continuation-in-part of Ser. No. 664,277, Mar. 5, 1976, abandoned. This application Aug. 23, 1976, Ser. No. 716,980

Int. Cl.² B63H *1/20*

U.S. Cl. 416—245 A **10 Claims**



1. A combination nose piece and anodic propellor shaft protector kit for marine craft comprising: a cup-shaped brass fastener adapted to be assembled over the end of a propellor shaft outwardly of a propellor mounted on said shaft, said fastener having a fully enclosed forward end and a threaded well mateable with the threaded outboard end of a propellor shaft and externally threaded over the major portion of the exterior thereof, a bullet-shaped zinc nose piece having a fully enclosed forward end and a threaded well opening axially through the larger end thereof and sized to mate with the external threads of said cup-shaped fastener, separate and independent means for holding said brass fastener detachably assembled to a propellor shaft and for holding said nose piece against counter-rotation and disassembly from said brass fastener, and said brass fastener being reusable with a series of zinc nose pieces as one after another of said nose pieces are sacrificed and become unserviceable in use.

4,077,743
COMPRESSION MACHINERY METHOD AND APPARATUS

W. Winston Cochrane; Carl H. Geary, both of Greensburg, Pa., and Derek Fothergill, Northfleet, England, assignors to Carrier Corporation, Syracuse, N.Y.

Filed Jan. 17, 1977, Ser. No. 759,694

Int. Cl.² F04B *23/04*

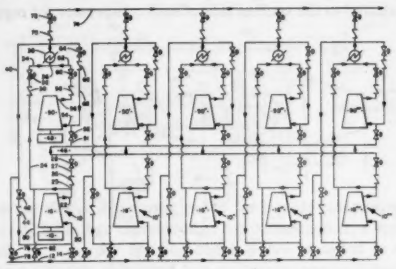
U.S. Cl. 417—53 **9 Claims**

1. A method of operating compression machinery having at least a low pressure stage, a high pressure stage, and a single aftercooler comprising the steps of:

starting the low pressure stage while maintaining the high pressure stage inactive;

directing the fluid discharged from the low pressure stage serially through a first bypass path about the high pressure

stage, through the aftercooler and back to the suction of the low pressure stage;
activating the high pressure stage;
delivering a first portion of the fluid flow discharged from the low pressure stage to the suction side of the high pressure stage while continuing to direct the remaining portion of the fluid flow through the bypass path;



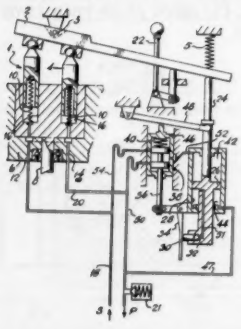
bypassing the fluid discharged from the high pressure stage through the aftercooler back to the suction side of the high pressure stage; and
reducing the flow of fluid through the first bypass path as the first portion of the fluid flow is increased due to increased flow requirements resulting from operation of the high pressure stage.

4,077,744

CONTROL SYSTEMS FOR VARIABLE CAPACITY HYDRAULIC MACHINES

Carlo Pensa, Como, Italy, assignor to Massey-Ferguson Services N.V., Curacao, Netherlands Antilles

Filed Nov. 17, 1975, Ser. No. 632,413
Claims priority, application United Kingdom, Nov. 18, 1974, 49874/74
Int. Cl.[2] F04B *1/26;* F01B *13/04*
U.S. Cl. 417—218 **3 Claims**



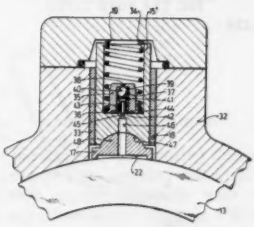
1. In a fluid translating device having a fluid pressure conduit connected thereto, adjusting means to vary the fluid flow through the device, regulator means operable upon said adjusting means to maintain the power consumption of said device below a predetermined maximum level, where the regulator means includes motor means connected to the adjusting means, valve means operable to control the motor means, variable transmission means operable on the valve means and including a member movable conjointly with the adjusting means to vary the ratio thereof in response to the volume displacement of the device and pressure signaling means responsive to pressure in the conduit and operable through the transmission means to move the valve means by an amount proportional to the product of the force received from the pressure signaling means and the volume displacement of the device, the improvement comprising: the valve means including a body and spool slideable within said body, said body slideable relative to the device, feedback means movable by the motor means and operable to apply a force on said valve body to move the valve body in response to movement of the motor means, said valve body biased to permit application of the product force in one direction and the feedback means force in the other direction, said feedback means force causing movement of said valve means to offset the correction resulting from application of the product force on said valve means.

4,077,745

ADJUSTMENT MECHANISM FOR RADIAL-PISTON PUMP

Werner Rometsch, Gerlingen, and Horst Willmer, Hemmingen, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Feb. 10, 1977, Ser. No. 767,356
Claims priority, application Germany, Feb. 26, 1976, 2607780
Int. Cl.[2] F04B *1/06*
U.S. Cl. 417—221 **11 Claims**



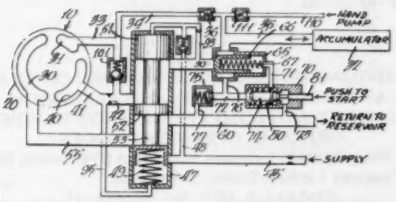
1. In a pump whose displacement elements have strokes variable by an annular adjustment member displaceable in turn by a pair of diametrically opposed pistons of different effective hydraulic surface areas, the pump output being supplied to the smaller piston and through a passage in said smaller piston to a depressurizing region at the interface between said smaller piston and said adjustment member, the improvement comprising means including a pressure-limiting valve in said passage for only allowing fluid flow through said passage to said depressurizing region after pressure has built up behind said piston to a predetermined level equal at most to a small fraction of the maximum pressure producible by said pump.

4,077,746

HYDRAULIC INTENSIFIER SYSTEM

Richard W. Reynolds, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 11, 1974, Ser. No. 460,120
Int. Cl.[2] F04B *17/00;* F16D *31/02*
U.S. Cl. 417—225 **12 Claims**



1. A hydraulic intensifier and motor system comprising, a casing, a member rotatable in said casing and having a plurality of cylinders, a piston movably mounted in each cylinder, cam means for stroking said pistons in said cylinders, a plurality of

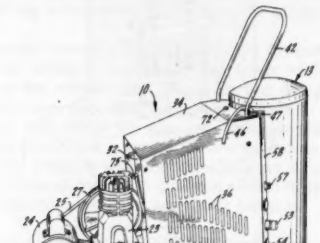
independent ports positioned for communication with one or more of said cylinders at certain rotational positions of said member including a first port, a second port and a third port with said first port having the greatest effective length, a first line, a second return line and a third line having a non-return check valve and an accumulator, and a control circuit including valve means operable in an intensify mode with rotation of the member in one direction for delivering fluid pressure in said first line to said first port to rotate said member, and to connect said second and third ports to the return line and the third line respectively, said control circuit including means to utilize high pressure fluid stored in said accumulator in a start mode for delivery to said cylinders to rotate said member in an opposite direction, a start valve operable to bypass said check valve and connect said accumulator to said cylinders and a pilot valve for operating said start valve.

4,077,747

PORTABLE AIR COMPRESSOR

Thomas I. Burenga, Richland Center, Wis., assignor to TSC Industries, Inc., Chicago, Ill.

Filed Sep. 7, 1976, Ser. No. 721,041
Int. Cl.² F04B *21/00*
U.S. Cl. 417—234 **6 Claims**



1. A portable air compressor comprising:

a base assembly including a base, a pump and a pump drive unit mounted on the base, a pair of wheels supporting one end of the base, and a stand supporting the other end of the base;

a shroud assembly, including a four-panel shroud open at the top and at the bottom, pivotally mounted on one end of the base assembly for movement between a normal position, in which the shroud encloses the pump and the pump drive unit, and an open position, in which the pump and pump drive unit are fully exposed for service, from three sides and from above;

a tank mounted on and closing the top of the shroud;

and air conduit means connecting the outlet of the pump to the tank and maintaining that connection for all positions of the shroud.

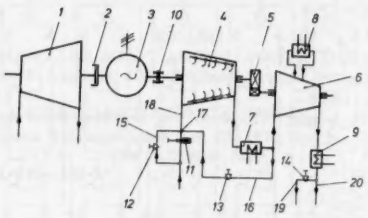
4,077,748

TURBOMACHINE PLANT COMPRISING COUPLED GAS TURBINE, SYNCHRONOUS ELECTRICAL MACHINE AND COMPRESSOR UNITS HAVING OPTIONAL OPERATING MODES

Franz Pötz, Burstadt, Germany, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Oct. 3, 1975, Ser. No. 619,311
Claims priority, application Germany, Oct. 25, 1974, 2450710
Int. Cl.² F04B *17/00*
U.S. Cl. 417—319 **7 Claims**

2. A turbomachine plant having alternative dual operating modes comprising a gas turbine coupled to a synchronous electrical machine, a compressor coupled to said synchronous electrical machine during both operating modes, said gas turbine serving to drive said synchronous electrical machine during a first operating mode and which functions as a power generator, said synchronous electrical machine functioning as a motor during a second operating mode for driving said compressor for producing compressed air, a main control valve connected to the suction side of said compressor for regulating



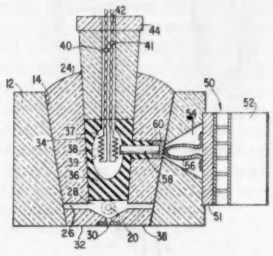
air flow through the compressor during said second operating mode, a by-pass line around said main control valve, and an auxiliary valve in said by-pass line for admitting a small amount of air flow through the compressor during said first operating mode and when said main valve is closed, the amount of air passed through said auxiliary valve being such as to reduce its power consumption to a low level but which does not reach to the stall limit of the compressor.

4,077,749

SAMPLE EJECTION SYSTEM INCLUDING TEMPERATURE CONTROL

Walter R. Hogg, Miami Lakes, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Continuation-in-part of Ser. No. 493,828, Aug. 1, 1974, Pat. No. 3,939,409. This application Dec. 23, 1975, Ser. No. 643,920
Int. Cl.² G01N *27/00*; F04B *35/00*
U.S. Cl. 417—321 **24 Claims**



1. In a sample ejecting system including a sample ejecting device having means for receiving and temporarily storing an aliquot of sample including an inlet port and an outlet port connected in a first position, and a thermal expansion device mounted within said receiving and storing means operative to heat and expand into said storing means in a second position for ejecting a predetermined volume of said sample, the improvement comprising:

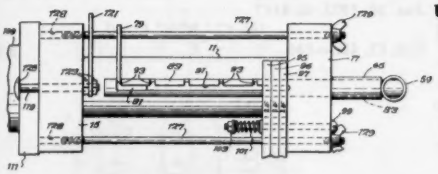
thermal conduction means coupled to said sample ejecting device, said thermal conduction means operative in a first mode following the ejection of said predetermined volume of said sample to conduct heat from said sample ejecting device for cooling and contracting said expansion device.

4,077,750

ADJUSTABLE LIQUID DISPENSING PUMP

George H. Hake, 11154 Broadway, Alden, N.Y. 14004

Filed Jan. 28, 1976, Ser. No. 653,201
Int. Cl.[2] F04B *21/04*; G01F *11/02*
U.S. Cl. 417—552 9 Claims



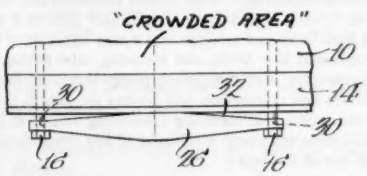
1. An adjustable dispensing pump for liquids comprising: a base having a passage therethrough for connection to a source of liquid, an inwardly opening check valve mounted in said passage; a separate elongated barrel, having one end thereof removably mounted in said base, forming a pump chamber communicating through said check valve with said source of liquid; a spout member removably carried by the other end of said barrel, said spout member having a discharge chamber communicating with said pump chamber and a discharge nozzle communicating with said discharge chamber; a piston slidably reciprocatable in said barrel; a check valve carried by said piston permitting flow therethrough only from the rear of said piston to the front thereof; a piston rod operatively attached to said piston on the front thereof and extending through said spout member; an operating handle connected to said piston rod; and means, slidably carried by and having a portion cooperating with said spout member to arrest outward movement of said piston, said means comprising a tube removably attached to and movable by said handle with said piston rod for selectively determining the volume of liquid dispensed by an outward stroke of said piston, said tube being provided with slidable and rotatable means therein for restricting the length of the piston stroke.

4,077,751

END HOUSING CLAMPS FOR ROTARY MECHANISMS

Alexander Goloff, East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 1, 1975, Ser. No. 573,670
Int. Cl.[2] F01C *21/10*; B65D *45/02*
U.S. Cl. 418—270 5 Claims



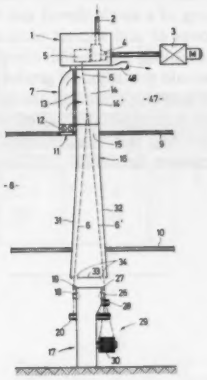
1. In a rotary mechanism including at least two housings, means clamping the housings together to define an operating chamber, and a rotor mounted for movement within said chamber, the improvement wherein said clamping means include at least one elongated clamping bracket having a convex face when unstressed, said convex face being in contact with a side of one of said housings opposite of the operating chamber, and means operatively associated with said housings and the ends of said clamping bracket for stressing said clamping bracket to bring said convex face into contact with said side along most of the length of said face.

4,077,752

APPARATUS FOR TAKE-UP AND STORAGE OF THREAD BUNDLES

Willy Zahn, Heusenstamm, Germany, assignor to Zimmer Aktiengesellschaft, Germany

Filed Feb. 9, 1976, Ser. No. 656,342
Claims priority, application Germany, Feb. 10, 1975, 2505547
Int. Cl.[2] D01D *7/00, 13/00*
U.S. Cl. 425—72 S 8 Claims



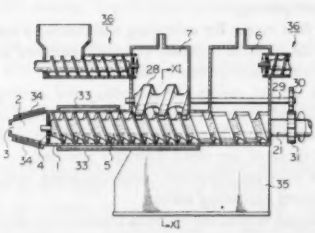
1. Apparatus for taking up and storing thread bundles produced from high polymer spinning materials comprising a series of spinnerets aligned in a row with each spinneret adapted to extrude a bundle of threads in a downward direction, a blow duct connected to the discharge end of each spinneret, a spinning duct connected to the lower end of each blow duct, and an elongated take up machine disposed beneath the lower ends of said spinning ducts, said machine being aligned with and centered with respect to said row of spinnerets, wherein said take-up machine includes along its length on one side a row of winding devices and along its length on the other side a row of thread-combining rollers, each of said spinning ducts including means arranged to direct the thread path to either side of said take-up machine.

4,077,753

MARBLEIZED SOAP BAR PLODDER

Yoshio Tanaka, Tokyo, Japan, assignor to Ideal Soap Co., Tokyo, Japan

Filed May 18, 1976, Ser. No. 687,616
Claims priority, application Japan, Oct. 9, 1975, 50-121309
Int. Cl.[2] B29F *3/12*
U.S. Cl. 425—131.1 3 Claims



1. A plodder for producing extruded soap comprising:
a. an elongated cylinder having first and second openings spaced longitudinally along the side thereof and an extrusion head toward one end thereof,
b. first and second soap inlet means respectively coupled to said first and second openings for enabling respective first

and second soap materials to be fed to the interior of said cylinder,

c. a multithread extruding screw rotatably mounted within said cylinder to propel said first and second soap materials from said openings to said extrusion head, said screw having along its length a first section of threads juxtaposed with a second section of threads,

d. a closure screw disposed in said first soap inlet means and in said first opening whose ridges engage nonadjacent grooves of said first section of threads, said nonadjacent grooves being of a single thread and being continuations of the grooves of said second section, said engagement thereby preventing substantial entry of said first soap material into said non-adjacent grooves but allowing entry of said first soap material into the intermediate grooves between said non-adjacent grooves, and

e. means for driving said closure screw and said extrusion screw in opposite directions.

4,077,754

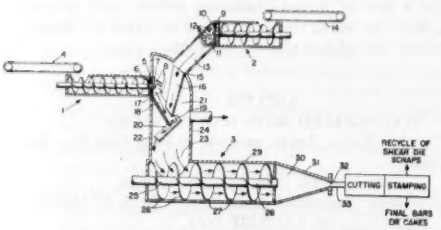
APPARATUS FOR MAKING VARIEGATED SOAP BARS OR CAKES

Thomas A. Borcher, Elsmere, Ky., and John R. Knochel, Blue Ash, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 546,053, Jan. 31, 1975, Pat. No. 3,993,722. This application Sep. 7, 1976, Ser. No. 720,546

Int. Cl.² B29F *3/12*

U.S. Cl. 425—131.1 **3 Claims**



1. An apparatus for making variegated soap bars, said apparatus comprising:

(a) a first means for extruding and cutting a soap meas of one color to form a stream of small diameter soap noodles of about ¼ inch or less in diameter;

(b) a second means for extruding and cutting a differently colored soap mass to form a stream of larger diameter soap noodles having diameter at least about twice as large as those of the small diameter noodles;

(c) a vacuum chamber communicating with the first and second extruding means;

(d) means within the vacuum chamber for directing together the streams of small and larger diameter noodles to achieve commingling of the noodles;

(e) means further communicating with the vacuum chamber for plodding the commingled noodles into a variegated soap log; and

(f) means downstream of said plodding means for forming the soap log into variegated soap bars.

4,077,755

APPARATUS FOR CONTINUOUSLY PREPARING A SYRUP OF A MONOMER-POLYMER MIXTURE

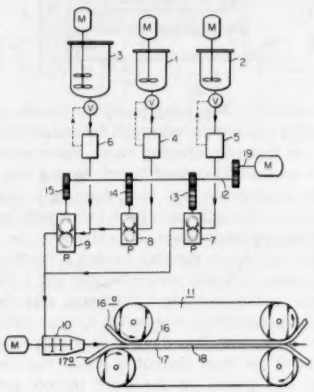
Tetsuji Kato, Otake, Japan, assignor to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Division of Ser. No. 434,064, Jan. 17, 1974, Pat. No. 3,966,693. This application Jan. 15, 1975, Ser. No. 541,111

Claims priority, application Japan, Jan. 18, 1973, 48-8161; Jan. 18, 1973, 48-8167

Int. Cl.² B29C *15/00*

U.S. Cl. 425—146 **3 Claims**



1. A system for continuously preparing and continuously casting a polymerizable prepared syrup comprising a mixture of a first liquid and at least a second liquid, said system comprising a first tank for containing a supply of said first liquid, a second tank for containing a supply of said second liquid, interspaced continuously running belt spans having side sealing gaskets and forming a continuously traveling casting space having an entrance, mixing means for continuously intermixing said liquids to form said mixture and for continuously feeding this mixture to said entrance, first pump means having a connection with said first tank for continuously pumping said first liquid from said first tank at least at one constant flow rate to said mixing means, and second pump means having a connection with said second tank for continuously pumping said second liquid from said second tank at least at one constant flow rate to said mixing means; and in which at least one of said pump means and its said connection comprises a metering tube having an upper end connection with the one of said tanks from which that one of the pump means pumps, said upper end connection including a valve means automatically responsive to close when a liquid level rises in said tube to a predetermined high level and to open when said liquid level falls to a predetermined low level, said metering tube having a lower end connection, and a metering pump receiving liquid from said lower end connection and having an output connection with said mixer, said metering tube being vented at its top so that said metering pump is relieved of any pressure conditions in said one of the tanks.

4,077,756

INJECTION MOLDING EXTRUSION MIXER

William R. Meadors, Marion, Ind., assignor to Peerless Machine & Tool Corporation, Marion, Ind.

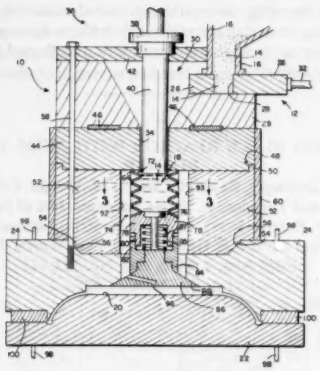
Filed Sep. 8, 1976, Ser. No. 721,291

Int. Cl.² B29F *3/02*

U.S. Cl. 425—207 **22 Claims**

1. In a machine having a cylinder with a generally cylindrical chamber for receiving thermoplastic material and pressurization means operatively associated with the chamber for applying pressure to the material in the chamber, a plurality of

axially stacked annular washers lining the inside walls of the chamber for reception of the thermoplastic material into that portion of the chamber bounded generally by the inner diameters of said washers, said washers forming a plurality of axially narrow annular extrusion passages between said washers upon pressurization of the material; and retaining means at opposed



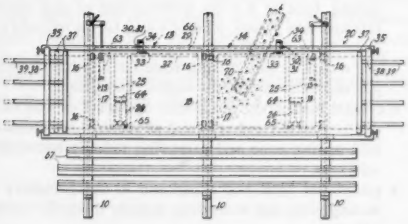
ends of the chamber for retaining said washers in a stacked relation, said chamber being shaped relative to the outer diameters of said washers to provide a flow passage between said washers and the inside walls of the chamber whereby pressurization of the material in the chamber causes extrusion of the material outwardly through said extrusion passages between said washers and into said flow passages.

4,077,757

CONCRETE PANEL MAKING APPARATUS

James W. DeCoster, 137 James St., Green Bay, Wis. 54303

Filed Mar. 28, 1977, Ser. No. 781,951
Int. Cl.² B28B *11/22*
U.S. Cl. 425—218 **7 Claims**



1. A concrete panel forming apparatus for use on a concrete panel is cast in a mold, comprising:

a base;

a carriage mounted on such base; and movable back and forth thereon;

a mold supported by such carriage and hingedly attached thereto, adapted to pivot longitudinally about such hinged connection from a horizontal to a vertical position with respect to such carriage;

means for mechanically spreading concrete into the mold while such mold is in a horizontal position upon such carriage;

means for pivoting such mold longitudinally from a horizontal position to a vertical position;

means for removing a concrete panel formed within the mold;

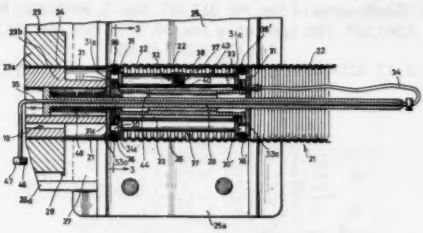
means for moving the mold along the base.

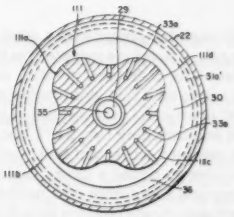
4,077,758

DEVICE FOR DEFORMING HOLLOW SECTIONS

Warner Jan de Putter, 11, Jan van Arkelstraat, Hardenberg, Netherlands, assignor to Warner Jan de Putter, Zwolie, Netherlands

Filed Mar. 27, 1972, Ser. No. 238,191
Claims priority, application Netherlands, Mar. 26, 1971, 7104137; Mar. 26, 1971, 7104138
Int. Cl.² B29D *23/03, 23/04*
U.S. Cl. 425—387.1 **3 Claims**





1. A device for deforming hollow sections of thermoplastic material comprising:

an elongated hollow mold for surrounding a hollow section to be deformed;

a pipe-inflating assembly having at least two spaced chambers disposed within the interior of said hollow mold;

each said chamber being disposed between two walls;

a flexible solid sealing ring sealingly disposed between said walls to define the outer periphery of said chamber and being radially outwardly movable in its entirety relative to said walls;

a first pressure fluid source in communication with each said chamber to at least one opening provided therein for admitting and discharging a first fluid under pressure to each said chamber to expand and move each said solid sealing ring in its entirety relative to said two walls;

each said solid sealing ring is unstretched in its expanded position;

each said solid sealing ring having an outer circumference which is greater than the outer circumference of said walls;

means for retracting each said solid sealing ring so that it can be entirely accommodated in its associated annular chamber;

said retracting means being in communication with each said chamber to said at least one opening therein;

each of said two walls having a radial surface which is disposed substantially perpendicular to the longitudinal axis of said hollow mold and upon which surface said solid sealing ring moves while sealing its associated annular chamber;

wherein said outer circumference of each said solid sealing ring in its unstressed condition is substantially equal to the inner diameter of said hollow section in its final deformed state; and a connecting part interconnecting said two

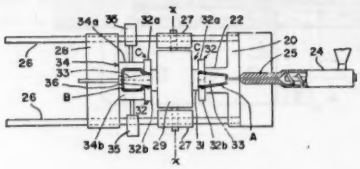
walls, said connecting part having cusps pointing toward said longitudinal axis of said hollow mold, and the outer circumference of the connecting part being spaced radially inward of the inner circumference of said solid sealing ring to define the inner periphery of said chamber.

4,077,759

MOLD ASSEMBLY

Robert W. Saumsiegle, Wellesley, and Ieuan L. Harry, Billerica, both of Mass., assignors to The Continental Group, Inc., New York, N.Y.

Continuation of Ser. No. 312,257, Dec. 5, 1972, Pat. No. 3,941,539. This application Jan. 30, 1976, Ser. No. 653,844
Int. Cl.² B29D *23/00*
U.S. Cl. 425—451 **11 Claims**



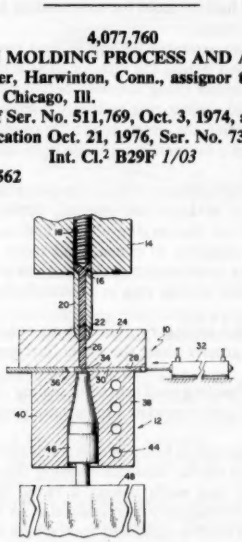
1. A mold assembly comprising a pivot member defining a pivot axis, a pair of supports mounted on said pivot member in crossing relation for individual pivoting about said pivot axis, at least two molds with said molds being disposed on opposite sides of said pivot axis, each of said molds being of a split construction and including two parts, one part of each of said molds being mounted on each of said supports for cooperation with one another to define a closed mold and for movement with said supports away from one another to define an open mold, and actuator means coupled to said supports for oscillating said supports and said mold parts about said pivot axis for simultaneous movement of each pair of said mold parts between a mold opening position and a mold closing position.

4,077,760

INJECTION MOLDING PROCESS AND APPARATUS

Donald G. Sauer, Harwinton, Conn., assignor to National Can Corporation, Chicago, Ill.

Continuation of Ser. No. 511,769, Oct. 3, 1974, abandoned. This application Oct. 21, 1976, Ser. No. 734,410
Int. Cl.² B29F *1/03*
U.S. Cl. 425—562 **4 Claims**



1. In an injection molding machine having an assembly adapted to inject a plastic fluid molding material from an extrusion nozzle into an article forming cavity of said injection molding machine, the improvement comprising:

a gating means provided with first and second orifices, said first orifice having a diameter larger than said second orifice, said gating means being disposed between said extrusion nozzle and said article forming cavity; and

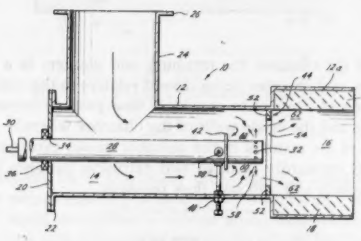
motive means connected to said gating means for moving said gating means from a position wherein said first orifice is disposed between said extrusion nozzle and said article forming cavity to a second position wherein said second orifice is disposed between said extrusion nozzle and said article forming cavity during introduction of said fluid molding material through said orifices into said article forming cavity to thereby ensure thorough packing of said plastic material.

4,077,761

CARBON BLACK REACTOR WITH AXIAL FLOW BURNER

Robert E. Dollinger, Bedford; Clinton M. Wright, Odessa, both of Tex., and Theodore A. Ruble, deceased, late of Fort Worth, Tex. (by Eulalia Berry Ruble, executrix), assignors to Sid Richardson Carbon & Gasoline Co., Fort Worth, Tex.

Filed Aug. 4, 1976, Ser. No. 711,443
Int. Cl.² F23C *7/00*
U.S. Cl. 431—8 **9 Claims**



1. A burner comprising:

a housing defining a generally cylindrical mixing zone having a central axis extending longitudinally therethrough;

means for introducing oxidant gas into said mixing zone to flow axially therethrough;

means for non-axial introduction of gaseous fuel into said mixing zone at a point downstream of said oxidant gas introduction means, whereby said fuel is released into said flowing oxidant gas;

mixer means in said mixing zone for admixing said oxidant gas and fuel, said mixer means comprising,

a central bluff body positioned upstream of said fuel introduction means and centered about the longitudinal axis of said mixing zone and extending radially outwardly from said axis,

a peripheral bluff body disposed at the periphery of said mixing zone and extending radially inwardly toward said axis,

said central and peripheral bluff bodies being spaced axially from each other; and

a combustion zone downstream from said mixing zone for combusting said admixed fuel and oxidant gas,

said combustion zone being free of turbulence generating means whereby the products of combustion thereof may flow linearly therethrough.

4,077,762

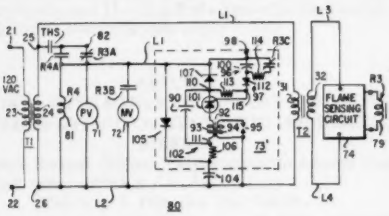
FUEL IGNITION SYSTEM HAVING CONTACT INTERLOCK PROTECTION

Russell Byron Matthews, Goshen, Ind., assignor to Johnson Controls, Inc., Milwaukee, Wis.

Filed Jun. 21, 1976, Ser. No. 698,162
Int. Cl.² F23Q *9/08, 23/00*
U.S. Cl. 431—45 **22 Claims**

1. In a fuel ignition system including pilot valve means oper-

able when energized to supply fuel to a pilot outlet for ignition by an igniter means to establish a pilot flame, and main valve means operable when energized to supply fuel to a main burner apparatus for ignition by the pilot flame, a control arrangement comprising control means including first switching means, second switching means operable when enabled to provide an energizing path for said first switching means and said pilot valve means to effect energization of said pilot valve means, permitting fuel to be supplied to said pilot outlet, activate means responsive to a demand for heat to enable said second switching means to provide said energizing path to energize said first switching means and said pilot valve means, said first



switching means being operable when energized to provide a holding path for said pilot valve means and said first switching means, said control means further including flame sensing means responsive to the establishment of a pilot flame for connecting said main valve means to said holding path to effect energization of said main valve means, permitting fuel to be supplied to said main burner apparatus, and for causing said energizing path to be interrupted whereby said first switching means, said pilot valve means and said main valve means are maintained energized over said holding path, said activate means being operable when the demand for heat has been met to interrupt said holding path to thereby deenergize said pilot valve means and said main valve means.

4,077,763

METHOD FOR REGULATING COMBUSTION PROCESSES, PARTICULARLY FOR THE PRODUCTION OF CEMENT IN A ROTARY KILN

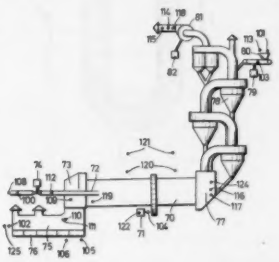
Gernot Jäger, Cologne; Hubert Wildpaner, Bensberg-Refrath; Horst Herchenbach, Troisdorf; Heinrich Rake, Aachen; Lutz Pütter, Raunheim, and Heinrich Lepers, Roetgen-Rott, all of Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Feb. 24, 1976, Ser. No. 660,863

Claims priority, application Germany, Feb. 24, 1975, 2507840

Int. Cl.[2] F27B *15/00, 7/02*

U.S. Cl. 432—14 **45 Claims**



1. A method of calcining minerals particularly lime-containing minerals in the form of pulverized raw material, comprising the steps of:

feeding a combustible fuel-air mixture to a burner in a rotary kiln and exhausting gases from the kiln through a cyclone heat exchanger;

feeding the pulverized raw material to the kiln through the heat exchanger to preheat the raw material in the heat exchanger and calcine the raw material in the rotary kiln, the calcined material preheating the fuel-air mixture;

measuring and generating a signal representing, the temperature of the fuel-air mixture;

measuring and generating a signal representing the temperature of the exhaust gases;

measuring and generating a signal representing the quantity of added raw material, the quantity of added fuel;

measuring and generating a signal representing the gas composition of the exhaust gases;

forming a characteristic value signal from the generated signals to represent the exergy of the process; and

regulating the calcining process with the aid of the characteristic value signal.

4,077,764
PROCESS FOR THE CONTINUOUS DYEING OF TEXTILE POLYAMIDE FIBER MATERIAL WITH METAL COMPLEX DYES

Hans-Ulrich von der Eltz, Frakfurt am Main, and Gerhard Pfeiffer, Bad Soden, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 25, 1976, Ser. No. 690,057
Claims priority, application Germany, May 28, 1975, 2523658
Int. Cl.[2] D06P *5/00, 7/00*
U.S. Cl. 8—18 A 3 Claims

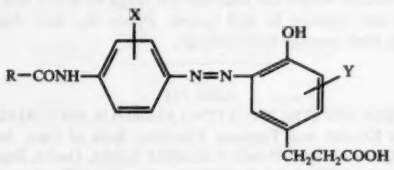
1. In a process for the continuous dyeing of a textile material web made of polyamide fibers using a 1:2 metal complex dyestuff according to a pad-dry heat fixation method, the improvement which comprises: padding said textile material web under weakly alkaline conditions with an aqueous liquor containing a solution of said dye-stuff together with a thermally cross-linkable binder system comprised of 80 – 120 g/l of acrylic acid derivatives with 45 – 55 g/l of a highly etherified precondensation product of melamine and formaldehyde, and 55 – 65 g/l of a polyacrylamide and 15 – 25 g/l of a heat-effective catalyst of the alkylolamine hydrochloride type.

4,077,765
MONOAZO-DYES PARTICULARLY SUITED TO THE LEVELLED DYEING OF SYNTHETIC POLYAMIDE FIBERS

Enzo Rosati, Seregno (Milan), Italy, assignor to Aziende Colori Nazionali Affini-ACNA S.p.A., Milan, Italy

Filed Aug. 2, 1976, Ser. No. 710,39,
Claims priority, application Italy, Aug. 25, 1975, 26540/75
Int. Cl.[2] C09B *27/00;* C07C *107/06*
U.S. Cl. 8—41 B 3 Claims

1. A process for imparting a yellow to yellow-orange shade to fabric made of irregular polyamide fibers comprising dyeing said fabric with a dyestuff having the formula:



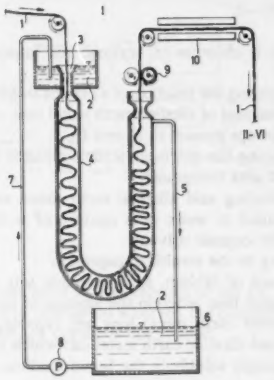
wherein R is a C_1–C_3 alkyl group, an unsubstituted aryl group or an aryl group substituted by a C_1–C_3 alkyl, a C_1–C_3 alkoxyl, chlorine, bromine, NO_2, CN, lower alkylsulphonyl, SO_2NH_2, $CONH_2$, CONR'R"; R' and R" being hydrogen or lower alkyl; and X and Y are independently selected from the group consisting of hydrogen, methyl, ethyl, CN, halogen and NO_2 in an aqueous bath having a pH value between 8.5 and 9, heating the bath to the boiling point and then decreasing the pH value to between 5 and 6.5 by adding an acid.

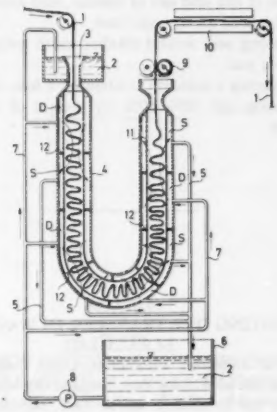
4,077,766
PROCESS FOR THE CONTINUOUS DYEING OF CELLULOSE FIBERS OR MIXTURES THEREOF WITH SYNTHETIC FIBERS WITH WATER-IN-SOLUBLE AZO DYESTUFFS DEVELOPING ON THE FIBER

Hans-Ulrich von der Eltz, Frankfurt am Main, Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Sep. 2, 1976, Ser. No. 720,069
Claims priority, application Germany, Sep. 4, 1975, 2539350
Int. Cl.[2] C09B *27/00;* D06B *1/00*
U.S. Cl. 8—44 16 Claims

1. A process for the continuous dyeing of fibers or filaments of natural or regenerated cellulose, or of a material comprising fibers or filaments of natural or regenerated cellulose, in rope form, which comprises: applying to the rope, by means of at least two dyeing liquors, the components for producing a water-insoluble developing azo dyestuff on the fibers or filaments, the first dyeing liquor applied to the rope being an alkaline liquor containing a dyestuff coupling component and being applied by passing the rope through an overflow system





comprising a substantially vertical conduit which is surrounded by a bath of the dyeing liquor, which bath is filled so that liquor overflows into the conduit, such that the overflowing liquor around the rope in the conduit has an opening effect on the rope.

4,077,767
PROCESS FOR THE PREPARATION OF CONCENTRATED SOLUTIONS OF UREA COMPOUNDS

Wolf-Eckhard Bleck; Horst Nickel, and Erich Kramer, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 14, 1975, Ser. No. 621,799
Claims priority, application Germany, Oct. 16, 1974, 2449206
Int. Cl.[2] C09B *67/00;* D06P *1/645*
U.S. Cl. 8—85 R 7 Claims

1. In a process for preparing a concentrated aqueous or aqueous/organic solution of low electrolyte content containing 10–60% by weight of an urea compound of the formula

$$F_1—NH—CO—NH—F_2$$

wherein F_1 and F_2 are identical or different radicals of dyestuffs or dyestuff intermediates containing acid groups, by reaction of an equivalent of each of two amines of the formulas

F_1—NH_2 and F_2—NH_2

with one equivalent of

Cl—CO—X

wherein X is chlorine or aryloxy; the improvement which comprises:

(1) conducting the reaction of a pH at 4.0–8.0 in the presence of an amount of alkaline earth metal ions equivalent to the acid groups present in F_1 and F_2;
(2) removing the sparingly soluble alkaline earth metal salt of said urea compound;
(3) suspending said alkaline earth metal salt of said urea compound in water or a mixture of water and a water miscible organic solvent;
(4) adding to the resulting suspension
  (a) a salt of lithium, an ammonium salt, or a salt of an organic base wherein the amount of such salt and said alkaline earth metal ions are capable of forming an second alkaline earth metal salt which is not more than sparingly soluble in the liquid medium of said suspension, or
  (b) equivalent amounts of the appropriate acid and base to form in situ said salt of lithium, said ammonium salt, or said salt or an organic base;
(5) removing said second alkaline earth metal salt as a precipitate; and
(6) recovering a solution containing a low electrolyte concentration and 10%–10% by weight of said urea compound.

4,077,768

INHIBITING DYE TRANSFER IN WASHING OR BLEACHING

James Pyott Johnston, Cincinnati, Ohio; John Robert Tate, deceased, late of Whitley Bay, England (by Mary Tate, administrator), and by Sidney Alfred Tate, administrator, Bolden Colliery, England, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jun. 17, 1976, Ser. No. 697,006

Claims priority, application United Kingdom, Jun. 20, 1975, 26337/75

Int. Cl.² D06L *3/00*

U.S. Cl. 8—107 **28 Claims**

1. A process for washing fabrics which comprises treating them in a water bath containing a dissolved or solubilized catalyst compound selected from the group consisting of:
(a) iron porphin and water-soluble or water-dispersible derivatives thereof;
(b) haemin chloride and water-soluble or water-dispersible derivatives thereof;
(c) iron phthalocyanine and water-soluble or water-dispersible derivatives thereof; and
(d) mixtures thereof;
the concentration of said compound being up to 10^{-4} molar and to which bath is also supplied an oxidizing bleaching agent, the amount of said bleaching agent supplied being equal to the amount which would give a concentration in the bleaching bath of up to 10^{-2} molar, said bleaching agent being released into the bleaching bath, after at least part of said compound has been dissolved or solubilized, at a rate not substantially greater than that at which it is removed from said bath by reaction with the contents thereof.

4,077,769

PROCESS FOR OBTAINING MATERIALS HAVING LOW CONTENT OF SOLUBLE ELEMENTS FOR MULTIPLE APPLICATIONS

D. Santos Garcia, c/o Ma Diaz de Haro 42, Bilbao, Spain

Filed Jan. 23, 1976, Ser. No. 651,785

Claims priority, application Spain, Jan. 27, 1975, 434.175

Int. Cl.² B08B *3/08*

U.S. Cl. 8—137 **5 Claims**

1. A process for obtaining fibrous inorganic materials with a low content of soluble elements comprising treating said fibrous material with deionized water inside a suitable tank to leach soluble elements therefrom, evacuating afterwards the water containing said soluble elements, centrifugating the fibers, and then drying said fibers, the cycle of said steps being repeated according to the maximum quantity of soluble elements desired to be removed.

4,077,770

TEXTILE CLEANING PROCESS INCLUDING SOIL-REPELLENT FINISH

Richard A. Rouvellat, 3620 Moreno Ave., No. 136, La Verne, Calif. 91750; Minoru Wada, 3067 Corda Dr., Los Angeles, Calif. 90049, and Shoji Yoshihara, 604 Marek Dr., Montebello, Calif. 90640

Filed Jul. 15, 1976, Ser. No. 705,408

Int. Cl.² D06L *1/00*

U.S. Cl. 8—142 **9 Claims**

1. In a process of dry cleaning and finishing garments in which said garments are first dry cleaned and then finished by suspending them from a conveyor and passing them through a steam tunnel in which they are subjected to heat and agitation for the removal of wrinkles, the improvement comprising the application to said garments following such dry cleaning and before entry into said steam tunnel of a stain repellent which is heat-settable within the temperature range to which said garments are exposed in said tunnel, within the time elapsing during their passage therethrough.

4,077,771

PROCESS FOR TREATING FIBROUS MATERIAL

Tomio Kuroki, and Teramae Kazuhiro, both of Otsu, Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka, Japan

Filed Jul. 7, 1976, Ser. No. 703,297

Claims priority, application Japan, Jul. 16, 1975, 50-87652

Int. Cl.² D06M *13/40*

U.S. Cl. 8—196 **12 Claims**

1. In a process for treating fibrous material which comprises applying to said fibrous material an alkaline substance and a functional compound capable of reacting under alkaline conditions selected from the group consisting of a compound represented by the general formulas (I) and (II) given below:

$$R_1OCH_2CH_2SO_2(R_3SO_2)mCH_2CH_2OR_2 \quad (I)$$

$$R_1OCH_2CH_2SO(R_3SO)mCH_2CH_2OR_2 \quad (II)$$

wherein
R_1 and R_2 : hydrogen or lower alkyl group having 1 to 4 carbon atoms
R_3 : alkylene group having 1 to 6 carbon atoms, —(R_4O)-n—R_4—, or phenylene group,
R_4 : alkylene group having 2 to 4 carbon atoms
m : 0 or 1
n : an integer of 0 or 1 to 50, and the compound tris(acryloyl) hexahydrotriazine, and thereafter heat-treating said fibrous material at a temperature of 100° C or higher, the improvement which comprises carrying out said process in the presence of an effective amount of an amino acid to inhibit the yellowing of the fibrous material, said amino acid selected from the group consisting of glycine, alanine, leucine, serine, aspartic acid, glutamic acid, lysine,

β-alanine, γ-aminobutyric acid, amino benzoic acid, anthranilic acid and γ-methyl glutamic acid.

4,077,772
METHOD FOR THE DETERMINATION OF HEMOGLOBIN IN TRACE AMOUNTS

Ulrich C. Geissler, Cary; William J. Stith, Mundelein, and Kathleen J. Jewett, Waukegan, all of Ill., assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

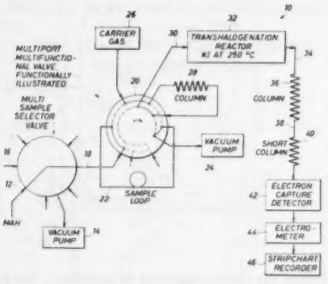
Filed May 31, 1977, Ser. No. 801,887
Int. Cl.² G01N *33/16*
U.S. Cl. 23—230 B **14 Claims**

1. The method of determining the presence of hemoglobin in a material which comprises: bringing said material into contact with an organic acid solution of tetramethylbenzidine and hydrogen peroxide to to form a mixture, allowing said mixture to stand for a predetermined period of time, and examining said mixture for the presence of a green colored complex indicative of the presence of hemoglobin, the improvement comprising: said organic acid being present in said solution concentration of at least 35 percent by volume.

4,077,773
METHOD AND APPARATUS FOR DETECTION OF MONOALKYLHALIDES

Stanley D. Stearns, Box 19032, Houston, Tex. 77024

Filed Dec. 27, 1976, Ser. No. 754,539
Int. Cl.² G01N *27/62, 31/00, 31/06*
U.S. Cl. 23—232 R **8 Claims**



1. A method of detecting traces of a monoalkylhalide comprising the steps of introducing a measured sample of gas of interest into a transhalogenation reactor having a surplus of iodine as an iodide therein for exchange therewith to form a monoalkyliodide and thereafter using a detector means to obtain a measure of the concentration thereof.

4,077,774
INTERFERENT-FREE FLUORESCENCE DETECTION OF SULFUR DIOXIDE

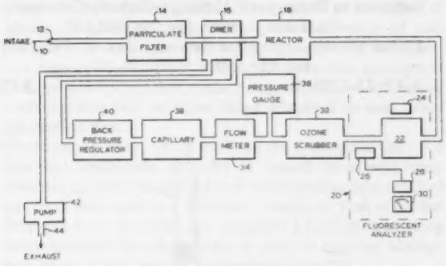
Radhakrishna Murty Neti, Brea, and Laurence Drell Graham, Claremont, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Feb. 14, 1977, Ser. No. 768,294
Int. Cl.² G01N *21/26, 21/38, 31/12*
U.S. Cl. 23—232 R **38 Claims**

1. The improved method of detecting sulfur dioxide in a gas sample comprising the steps of:

(a) passing the gas sample through a reactor which oxidizes hydrocarbons and passes sulfur dioxide;

(b) irradiating the gas sample with ultraviolet light; and,

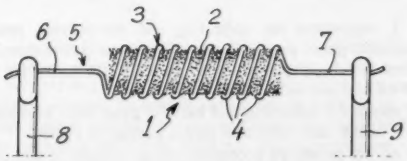


(c) measuring the level of fluorescence of the gas sample in response to said irradiation whereby the quantity of sulfur dioxide in the gas sample is determined.

4,077,775
ELEMENT FOR DETECTING THE PRESENCE OF COMBUSTIBLE GASES IN A GASEOUS ATMOSPHERE

Roger Lacroix, Suresnes; Manfred Wacker, Montsoult, and Claude Lambert, Paris, all of France, assignors to Comptoir Lyon-Alemand-Louyot, France

Filed Nov. 1, 1976, Ser. No. 737,707
Claims priority, application France, Dec. 5, 1975, 75 37332
Int. Cl.² G01N *27/16*
U.S. Cl. 23—254 E **8 Claims**



1. Element for detecting the presence of combustible gases in a gaseous atmosphere containing at least one oxidising agent, characterised in that it comprises:

a microporous support consisting essentially of a mixture of gamma- and/or eta-alumina and refractory fibres,

a catalyst layer based on a metal or an oxide of a metal from the family of the platinoids, located on at least a part of the surface of the microporous support, and

a filament based on platinum, of which at least a part is a coil wound round said support.

4,077,776
GAS AND GAS-CARRIED SUSPENDED MATTER INDICATOR TUBE HAVING FIXING ELEMENTS FOR REAGENT CARRIERS

Hans Möller, and Bernd Mussmann, both of Lubeck, Germany, assignors to Dragerwerk Aktiengesellschaft, Germany

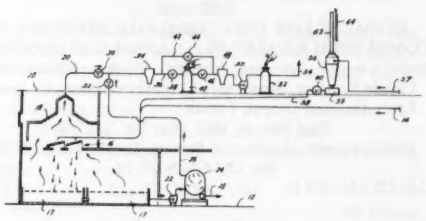
Filed Jun. 1, 1977, Ser. No. 802,434
Claims priority, application Germany, Jun. 18, 1976, 2627315
Int. Cl.[2] G01N *31/06, 31/22*
U.S. Cl. 23—254 R 5 Claims

1. An indicator tube, comprising a glass tube having a reagent carrier therein for indicating a gas or a suspension in a gas and a fixing element for the reagent carrier comprising sintered glass granules.

4,077,777
NEUTRALIZATION OF GASES

Werner Henke, P.O. Box 51932, Oil Center Station, Lafayette, La. 70501

Continuation of Ser. No. 496,652, Aug. 12, 1974, abandoned. This application Apr. 15, 1976, Ser. No. 677,061
Int. Cl.[2] B01J *8/02;* E21B *41/00*
U.S. Cl. 23—288 R 3 Claims



1. Apparatus for collecting and neutralizing potentially harmful gases containing hydrocarbons and sulphur compounds that escape at a highly variable rate during the drilling of oil and gas wells comprising,

means for collecting said harmful gases from proximate said wells, said collecting means having an outlet,

burner means for accepting a large volume of said gas at an inlet and burning the gas,

a catalytic desulphurization reactor having an inlet and an outlet,

means for conveying said collected gases from the outlet of said collecting means to the inlet of said desulphurization reactor at normal gas escape rates,

means for conveying said collected gases from the outlet of said collecting means to the inlet of said burner means at abnormally high gas escape rates,

heater means having an inlet in flow communication with a outlet of said valve means and an outlet in flow communication with the inlet of said desulphurization reactor for heating said gases prior to the gas' entry into the desulphurization reactor,

separating means having an inlet in flow communication with the outlet of said heating means and an outlet in flow communication with the inlet of said desulphurization reactor for separating water and particulate matter from said gases prior to their entry into the desulphurization reactor,

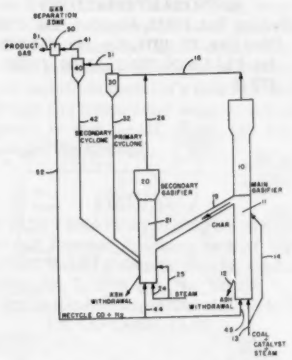
a catalytic oxidation reactor having an inlet and an outlet, means for conveying said gases from the outlet of said desulphurization reactor to the inlet of said oxidation reactor, and

second separating means having an inlet in flow communication with the outlet of said desulphurization reactor, said outlet in flow communication with the inlet of said oxidation reactor for separating water and particulate matter from the gases before they pass through the oxidation reactor.

4,077,778
PROCESS FOR THE CATALYTIC GASIFICATION OF COAL

Nicholas C. Nahas, Morris Plains, N.J., and Charles J. Vadovic, Houston, Tex., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 617,698, Sep. 29, 1975, abandoned. This application May 13, 1977, Ser. No. 796,781
Int. Cl.[2] C10J *3/54*
U.S. Cl. 48—202 11 Claims



1. In a process for the production of synthetic natural gas by the conversion of a solid carbonaceous feed, in the presence of a carbon-alkali catalyst, by contact of said feed in a gasification zone containing a fluidized bed of char, with steam and a mixture of hydrogen and carbon monoxide gases added to said zone to suppress reactions which compete with the formation of equimolar concentrations of methane and carbon dioxide from a stoichiometric equivalent of carbon and water, the improvement comprising

continuously supplying to a main gasification zone a solid carbonaceous feed, a carbon-alkali catalyst, steam and a mixture of hydrogen and carbon monoxide gases, gasifying said solids carbonaceous feed at temperatures ranging from about 1000° to about 1600° F and pressures ranging from about 100 psia to about 1500 psia by injecting gases upwardly at superficial linear velocities ranging from about 0.5 to about 3 ft/sec. sufficient to devolatilize and react with the solid carbonaceous feed to form char and gaseous effluent, maintain the char in fluidized state and entrain within the gaseous effluent from about 5 to about 30 percent of the fine solid char, based on the weight of total feed to said main gasification zone,

separating the entrained char from the gaseous effluent, and feeding said char into a secondary gasification zone, re-

covering from the gaseous effluent a synthetic natural gas consisting essentially of methane and a synthesis gas comprising hydrogen and carbon monoxide,

removing from said fluidized bed of char of said main gasification zone from about 5 to about 30 percent additional char, based on the weight of total feed,

feeding said char via dense phase transfer as an admixture of char and carbon-alkali catalyst into said secondary gasification zone,

continuously supplying to said secondary gasification zone steam and a mixture of hydrogen and carbon monoxide gases, gasifying said char at temperatures ranging from about 1000° to about 1600° F and pressures ranging from about 100 psia to about 1500 psia by injecting gases upwardly at superficial linear velocities below those employed in said main gasification zone and ranging from about 0.05 to about 1 ft/sec. sufficient to maintain the char in fluidized state, but insufficient to entrain any significant amount of the char,

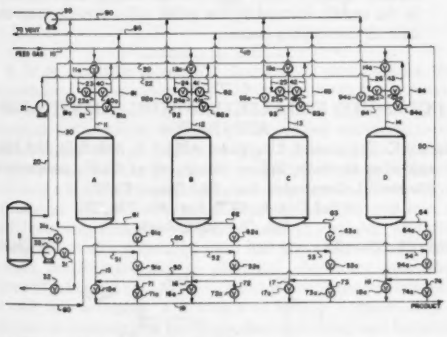
withdrawing a gaseous effluent from said secondary gasification zone and recovering synthetic natural gas consisting essentially of methane and a synthesis gas comprising hydrogen and carbon monoxide, from said gaseous effluent, recycling the recovered synthesis gases as the hydrogen and carbon monoxide gases supplied to the main and secondary gasification zones,

whereby more efficient utilization of the feed carbon is achieved than can be obtained by the sole use of the main reaction zone, even when said main reaction zone is operated at the same or conditions more favorable for gasification of the feed carbon.

4,077,779
HYDROGEN PURIFICATION BY SELECTIVE ADSORPTION

Shivaji Sircar, Allentown, and John W. Zondlo, Pittsburgh, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 15, 1976, Ser. No. 732,609
Int. Cl.² B01D 51/00
U.S. Cl. 55—25 **15 Claims**



1. The method of separating the components of a gaseous mixture into a primary gaseous product and a secondary gaseous product, in a system comprising a plurality of adsorption zones operated in cycle in a predetermined timed sequence, each of which adsorption zones contains a bed of solid sorbent preferentially selective for said secondary gaseous product component, which method comprises the following sequence of operational steps performed in the order recited in each of said adsorption zones in its turn:

(a) during a predetermined time period introducing the gaseous mixture to be separated to one of said adsorption zones and passing the same through the bed of sorbent in said zone while discharging from said zone unsorbed gas as primary gaseous product, said adsorption zone having been previously brought to desired superatmospheric feed gas pressure with primary gaseous product withdrawn from another adsorbent zone of said system;

(b) terminating operation of step (a) above as applied to the designated adsorbent zone and rinsing said zone in the direction of initial feed gas flow therethrough, with a stream of recompressed secondary gaseous product and at about the prevailing superatmospheric pressure of said adsorbent zone, while discharging from said zone a gaseous rinse effluent which is recycled to another adsorption zone of said system then undergoing step (a) for admixture with gaseous feed mixture being admitted to said other adsorption zone;

(c) lowering to an intermediate level the pressure in the zone that has undergone step (b) to desorb from said zone residual gas therein present and withdrawing said residual gas from said zone in a direction counter to that of earlier feed gas flow therein, said withdrawn residual gas being recompressed for use, at least in part, to rinse an adsorption zone of said system undergoing step (b);

(d) at about said intermediate pressure level purging the zone that has just undergone step (c) with air or an inert gas less strongly sorbed than said secondary gaseous product component of the feed gas mixture; thereafter

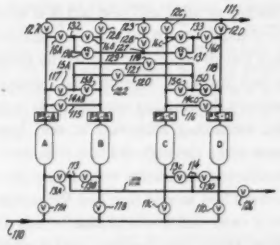
(e) evacuating the thus purged zone to a sub-atmospheric pressure level to remove therefrom purge gas introduced in step (d), and

(f) repressuring the zone to about the feed pressure of step (a) by admission thereto of a part of the primary product gas component withdrawn from an adsorption zone of said series then undergoing step (a).

4,077,780
RECOVERY OF HYDROGEN AND NITROGEN FROM AMMONIA PLANT PURGE GAS

Kishore Jasraj Doshi, Mahopac, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Oct. 20, 1976, Ser. No. 734,372
Int. Cl.² B01D 53/04
U.S. Cl. 55—26 **9 Claims**



1. In a process for separating gas mixtures comprising 1–7 volume precent ammonia, 3–8 volume percent argon, 6–12 volume percent methane, 16–25 volume percent nitrogen and the balance hydrogen by selectively adsorbing methane in an adsorption zone at a higher pressure and desorbing methane by pressure reduction to lower pressure, the improvement of recovering hydrogen and nitrogen from said gas mixture in a two-pressure equalization adsorption cycle utilizing activated carbon as a selective adsorbent material, said activated carbon adsorbent material being capable of rejecting substantial amounts of argon and methane inert constituents per unit amount of hydrogen and nitrogen recovered yet having the apparently disadvantageous characteristic of roughly equal selectivity for nitrogen and argon, but wherein said two-pressure equalization adsorption cycle is utilized to realize high recovery of nitrogen by operating beyond methane breakthrough in the second pressure equalization step without adverse effect on the product gas composition, comprising the steps of:

(a) providing four beds of activated carbon selective adsorbent material each with inlet and discharge ends;

(b) introducing said gas mixture to the inlet end of a first bed at first highest superatmospheric pressure for flow therethrough with selective adsorption of ammonia and methane and also adsorption of nitrogen and argon and discharge of unadsorbed product effluent comprising hydrogen, nitrogen and argon from the discharge end, continuing such flow so that a methane adsorption front is established at said inlet end and moves progressively toward the discharge end, and terminating such flow when said methane adsorption front is entirely within said first bed so that the bed remains filled with void space gas at said first highest pressure;

(c) first pressure equalizing said first bed with a second bed at higher intermediate pressure by releasing void space gas from the first bed discharge end and flowing same to the discharge end of the second bed having previously been partially repressurized to lower intermediate pressure;

(d) cocurrently depressurizing said first bed by releasing further void space gas from the discharge end and flowing same into the discharge end of a third bed partially loaded with said methane for countercurrent purging thereof at a lowest pressure;

(e) second pressure equalizing said first bed with said third bed at lower intermediate pressure by releasing sufficient additional void space gas from the first bed discharge end for methane breakthrough and flowing same to the third bed immediately after purging the adsorbate therefrom at said lowest pressure for partial repressurization of the third bed to lower intermediate pressure:

(f) reducing the inlet end pressure of said first bed thereby countercurrently desorbing part of the adsorbate and discharging same through said inlet end, and continuing the discharge until said first bed is at said lowest pressure;

(g) introducing cocurrent depressurization void space gas from a fourth adsorbent bed to the discharge end of said first bed for flow therethrough countercurrent to the previously flowing gas mixture so as to purge at least part of the remaining adsorbate at said lowest pressure and remove same through the bed inlet end;

(h) introducing additional void space gas from said fourth adsorbent bed to said first bed for partial repressurization thereof until said first and fourth beds are pressure equalized at lower intermediate pressure as the fourth bed second pressure equalizing;

(i) introducing void space gas from said second bed to the first bed discharge end for further repressurization thereof until said first and second beds are pressure equalized at higher intermediate pressure as the second bed first pressure equalizing;

(j) introducing product effluent from said third bed to the first bed discharge end for final countercurrent repressurization thereof to pressure above said higher intermediate pressure;

(k) reintroducing said gas mixture to the inlet end of the repressurized first bed in a manner analogous to step (b) and thereafter consecutively repeating steps (c) through (j); and

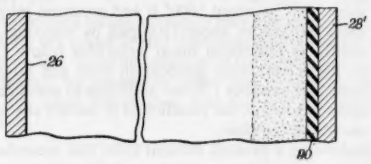
(l) consecutively following the sequence of steps (b) through (k) with the fourth, second and third beds in accordance with the flow cycle sequence of FIG. 3.

4,077,781

METHOD AND APPARATUS FOR FILTERING AND CLEANING THE FILTER

Nils Göran Sundström, Alta, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed Nov. 3, 1975, Ser. No. 628,230
Claims priority, application Sweden, Nov. 8, 1974, 7414092
Int. Cl.[2] B01D 46/04
U.S. Cl. 55—96 **12 Claims**



1. Method of cleaning a dust filter unit of the kind that comprises a plurality of flexible filter bags that are open to the clean air side and mounted on cages that prevent the filter bags from collapsing, the method comprising:

terminating the flow of dust laden air into the filter prior to cleaning the filter,

locating a distribution device having a plurality of nozzles so that the nozzles are in communication with the openings of all the filter bags, and

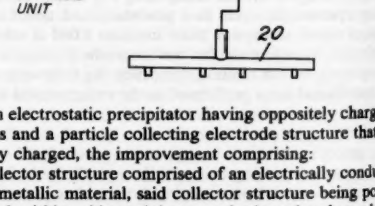
cleaning all the filter bags simultaneously, while the flow of dust laden air is terminated, by injecting repetitively pulsed high velocity air jets from the nozzles into the filter bags, said high air velocity jets being formed by repetitive sudden pressurization and then venting of the distribution device having the plurality of nozzles, said high velocity air jets being injected substantially in parallel with the walls of the filter bags and being thin relative to the width of the filter bags so that a considerable part of the length of the jets do not touch the filter bags, the total area of said nozzles being so small that it is the dominating restriction in the system formed by the pulse valve arrangement and said air conveying means.

4,077,782

COLLECTOR FOR ELECTROSTATIC PRECIPITATOR APPARATUS

James E. Drummond, Coronado; Alfred A. Mondelli, Del Mar, and Alan C. Kolb, Solana Beach, all of Calif., assignors to Maxwell Laboratories, Inc., San Diego, Calif.

Filed Oct. 6, 1976, Ser. No. 730,026
Int. Cl.[2] B03C 3/45
U.S. Cl. 55—139 **31 Claims**



1. In an electrostatic precipitator having oppositely charged electrodes and a particle collecting electrode structure that is negatively charged, the improvement comprising:

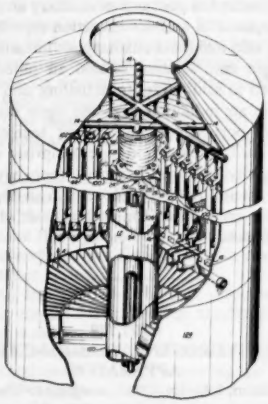
the collector structure comprised of an electrically conductive metallic material, said collector structure being positioned within said precipitator and adapted to have dust particles attracted to and being accumulated thereon;

a layer of insulating material attached to and covering a substantial length of the surface of said collector structure, said insulating material having a low triboelectric rank that is preferably lower than the triboelectric rank of the dust particles to be collected, the relaxation time of said insulating material being greater than the relaxation time of the space near the collector structure and the product of resistivity and thickness of said insulation not exceeding a value whereby the voltage drop across the insulating material exceeds about 10% of the applied voltage between the oppositely charged electrodes of said precipitator, the respective relaxation times of said insulating material and of space being the product of the electrical resistivity and the permittivity thereof.

4,077,783
INSULATOR MEANS FOR ELECTROSTATIC PRECIPITATORS

Horst Honacker, Paradise Valley, Ariz., assignor to Dart Industries, Los Angeles, Calif.

Filed Jun. 19, 1975, Ser. No. 588,225
Int. Cl.² B03C 3/02
U.S. Cl. 55—146 **7 Claims**

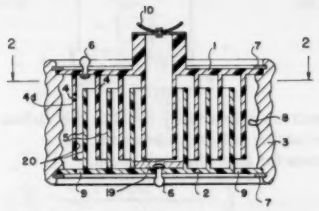


6. In an insulator means for electrostatic precipitators, the combination of: an electrostatic precipitator electrode means comprising a plurality of concentric spaced apart discharge electrodes of generally hollow cylindrical and circular in cross-section shape; said electrodes having a common central axis; a hollow vertical column means located concentric to said central axis; a hollow electrical insulator supported on said vertical column means and substantially aligned with said axis; a cantilever arm assembly supported on said insulator; said discharge electrodes suspended from said arm assembly and electrically coupled thereto; an electrical conductor extending upwardly through said hollow electrical insulator and coupled to said arm assembly; a plurality of hollow cylindrical and circular in cross section collector electrodes disposed between said discharge electrodes; one of said collector electrodes surrounding said insulator in close proximity thereto; and means for conducting clean pneumatic purge fluid between said one of said collector electrodes and said insulator to provide an aerodynamic curtain in surrounding relation to said insulator to prevent the collection of electrical conducting material on said insulator; said vertical column means is a hollow tubular member having a side wall provided with openings therein; a base for supporting said collector electrodes; first conduit means communicating with the interior of said vertical column means; a main housing surrounding said base and said electrodes and second conduit means disposed communicating with said first conduit means to supply clean pneumatic fluid into said main housing and to said first conduit means whereby said pneumatic fluid is supplied through said openings in said side wall of said vertical column means and between said vertical column means and said one of said collector electrodes so as to provide said aerodynamic curtain surrounding said insulator.

4,077,784
ELECTRIC FILTER

Lauri Väyrynen, Saaristonkatu 53 A 1, 92100 Raahe, Finland

Filed Sep. 29, 1975, Ser. No. 617,816
Claims priority, application Finland, Feb. 10, 1974, 2880/74
Int. Cl.² B03C 3/45
U.S. Cl. 55—146 **5 Claims**



1. An electric filter for separating impurities from air comprising:

a first housing member and a second housing member constructed of an electrical insulating material;

at least one tubular electrostatic separator plate integrally secured at one axial end to a first side of each of said housing members, said separator plates being constructed of an electrical insulating material;

insulating means securing said housing members together in a spaced relationship so that the first sides of the housing members face each other and so that the separator plates are coaxial and radially spaced from each other thereby forming an air passage between the separator plates;

air inlet means formed in the first housing member and air outlet means formed in the second housing member;

an electrically conductive coating formed on said separator plates and on the first side of each housing member; and

means for connecting the electrically conductive coatings on the two housing members to opposite poles of a source of electrical energy.

4,077,785
CORROSION RESISTANT ELECTROSTATIC PRECIPITATOR

Wayne T. Hartshorn, Sommerville, N.J., assignor to Research-Cottrell, Inc., Bound Brook, N.J.

Filed May 9, 1977, Ser. No. 795,070
Int. Cl.² B03C 3/02
U.S. Cl. 55—155 **11 Claims**

1. In an electrostatic precipitator:

a. a plurality of tubular collector electrodes each having a surface resistivity of the order of 10^6 ohms, the wall of said collector electrodes being a laminate and comprising the following layers in order from the inner surface outward;

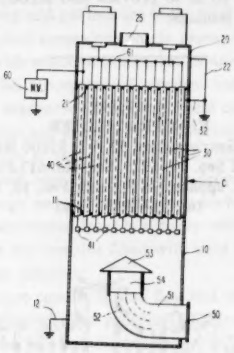
a-1 an interior surface layer comprising a conductive metal mesh interposed between inner and outer layers of resin impregnated with graphite and having a fiberglass veil;

a-2 an interior layer of fiberglass mat;

a-3 an exterior layer of fiberglass mat interposed between layers of fiberglass roving;

a-4 an exterior surface layer of fiberglass mat

b. a casing having an interior surface layer similar to that of said tubular collector electrodes and having a surface



resistivity substantially equal to the surface resistivity of the tubular collector electrodes; and

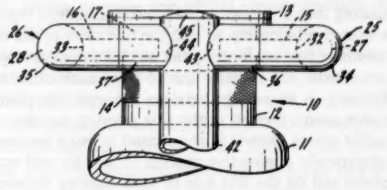
c. means for grounding said mesh.

4,077,786

LIQUID-GAS SEPARATION APPARATUS

Anthony Nicholas Chirico, Short Hills, N.J., assignor to Ecodyne Corporation, Lincolnshire, Ill.

Filed Mar. 7, 1977, Ser. No. 774,840
Int. Cl.² B01D *19/00*
U.S. Cl. 55—185 **7 Claims**



1. Apparatus for removing liquid droplets entrained in a gas stream comprising:

(a) a sealed enclosure in the shape of a right circular cylinder with a vertical central axis and having an inlet opening,

(b) a mesh pad liquid droplet separator spanning said enclosure in a horizontal plane,

(c) a pair of essentially identical gas outlet conduits located above said separator and extending outwardly from opposite surfaces of said enclosure in the same horizontal plane, said conduits each having a uniform rectangular vertical cross section, the intersection of one end of each conduit with said enclosure defining a generally rectangular gas outlet opening extending from between 90° and 180° around the circumference of said enclosure, the horizontal sides of said rectangular cross section of each conduit being at least four times longer than its vertical sides,

(d) a pair of essentially identical gas transfer pipes each having a right circular cylindrical portion with its central axis horizontal, said cylindrical portion of each said pipes intersecting the other end of one of said conduits so as to define a generally rectangular gas transfer opening in each pipe, and

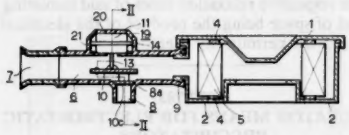
(e) a gas header connected to a terminal end of each of said pipes, whereby, said gas flows uniformly through said separator.

4,077,787

AIR CLEANER FOR AUTOMOTIVE VEHICLE

Hajime Akado, Kariya; Hideo Kamo, Chiryu, and Kazunori Nakane, Nishio, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Aug. 4, 1976, Ser. No. 711,642
Claims priority, application Japan, Aug. 6, 1975, 50-109476[U]
Int. Cl.² B01D *51/00*
U.S. Cl. 55—419 **4 Claims**



1. An air cleaner for an automotive vehicle comprising:

a filter element for cleaning air passing therethrough;

a casing housing said filter element;

an air induction pipe, coupled to said casing, and having a main air induction port and an auxiliary air induction port;

a valve disposed in said air induction pipe for closing and opening said main and auxiliary air induction ports; and

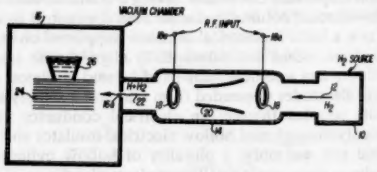
a diaphragm unit, secured to said air induction pipe and connected to said valve for actuating said valve to close said main air induction port and open said auxiliary air induction port when the ambient temperature is low, wherein said air induction pipe comprises a pair of longitudinally divided pipe members, each having a support member integrally formed thereon in an opposite relationship with each other for holding said diaphragm unit therebetween.

4,077,788

ATOMIC HYDROGEN STORAGE METHOD AND APPARATUS

John A. Woollam, Oberlin, Ohio, assignor to The United States of America asthe Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Apr. 13, 1976, Ser. No. 676,432
Int. Cl.² F17C *11/00*
U.S. Cl. 62—48 **6 Claims**



1. A method of storing high concentrations of atomic hydrogen, said method comprising:

(a) intercalating a layer compound with a gas,

(b) heating said intercalated compound in a vacuum to provide delamination of said compound and release and removal of said gas,

(c) cooling said delaminated layer compound to approximately 4° K,

(d) impressing a strong magnetic field on said delaminated layered compound, and

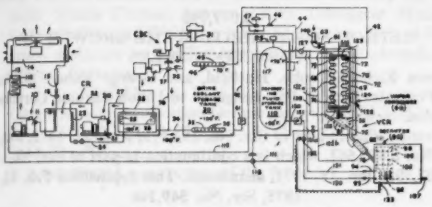
(e) collecting atomic hydrogen said cooled delaminated layer compound in the presence of said strong magnetic field.

4,077,789

VAPOR CONDENSING AND RECOVERY ASSEMBLY INCLUDING A DECANTER FOR VAPOR RECOVERY SYSTEM

Ray C. Edwards, Kinnelon, N.J., assignor to Edwards Engineering Corporation, Pompton Plains, N.J.

Division of Ser. No. 598,004, Jul. 22, 1975, Pat. No. 4,027,495.
This application Apr. 2, 1976, Ser. No. 673,043
Int. Cl.[2] F17C *7/02*
U.S. Cl. 62—54 7 Claims



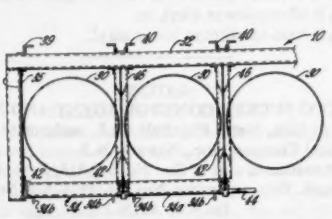
1. A vapor condensing and recovery assembly for recovering vapors of low volatile liquids such as hydrocarbons,
   a. vapor condensing means having, a housing,
   b. said housing having, an inlet means for passing vapors to be condensed to said vapor condensing means, and an outlet means for venting air and non-condensable gases from said vapor condensing means,
   c. U-shaped flow passage means in the upper section of said housing having, an entrance flow passage, and an exit flow passage,
   d. condensing means in said U-shaped flow passage means including, means on the condensing means to control the formation of frost and ice thereon,
   e. said entrance flow passage in communication with the inlet means and said exit flow passage in communication with the outlet means,
   f. a collecting space in said chamber disposed below the condensing means for collecting condensate from the condensing means.
   g. a decanter for separating the condensed vapor from the collected condensate and for recovering the same, and
   h. means connecting the collecting space in said housing to the decanter for passing collected condensate thereto.

4,077,790

NOISE SUPPRESSOR FOR A ROW OF ROTARY FIBERIZERS

Paul A. Goodridge, Granville, Ohio, assignor to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Filed May 27, 1977, Ser. No. 801,200
Int. Cl.[2] C03B *37/04*
U.S. Cl. 65—11 R 6 Claims



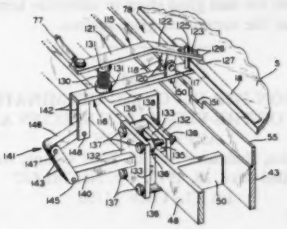
1. A noise suppressor in combination with a row of rotary fiberizing units having gaseous blast fiber attenuating means, comprising front and rear panels extending along the row of fiberizing units respectively on opposite sides thereof, a pair of end panels extending transversely of the row of fiberizing units, each end panel connecting an end portion of the front panel and a corresponding end portion of the rear panel, the front, rear, and end panels each having a pair of spaced inner and outer wall portions and a sound deadening material therebetween, and a plurality of panel-like baskets filled with sound deadening material and disposed respectively between pairs of adjacent fiberizing units.

4,077,791

ELECTRICAL CONTACT APPARATUS ON A GLASS SHEET GRAVITY MOLD

Waldemar W. Oelke, Rossford, Ohio, assignor to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Apr. 6, 1977, Ser. No. 785,202
Int. Cl.[2] C03B *23/02*
U.S. Cl. 65—273 10 Claims



1. In apparatus for forming relatively sharp angled bends in glass sheets including a frame, an outline type bending mold supported on said frame and having a shaping surface formed thereon, electrically conducting means on said frame including electrical contact assemblies engageable with electrically conducting lines formed on a glass sheet supported on said mold; the improvement in which each of said contact assemblies comprises a pair of spaced fingers biased toward each other for clamping engagement against opposite surfaces of said glass sheet, at least one electrical contact member secured to one of said fingers and engageable with one of said electrically conducting lines, means mounting said contact assembly on said mold, said mounting means comprising a support affixed to said mold and link means connecting said contact assembly to said support for movement relative thereto about a plurality of horizontal axes enabling said contact assembly to pivot and move vertically through a substantial path of travel along with said sheet relative to said mold.

4,077,792

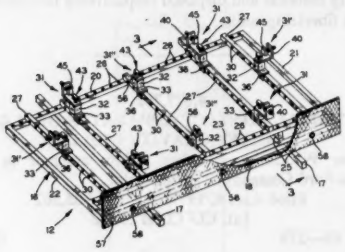
ADJUSTABLE RACK FOR SUPPORTING A GLASS SHEET

Torino E. Calevro, Perrysburg, and Floyd T. Hagedorn, Oregon, both of Ohio, assignors to Libbey-Owens-Ford Company, Toledo, Ohio

Filed Dec. 20, 1976, Ser. No. 752,019
Int. Cl.[2] C03B *29/04*
U.S. Cl. 65—288 14 Claims

1. A rack especially adapted for supporting a glass sheet intended to be heated to an elevated temperature comprising: a frame including a pair of longitudinally extending rails disposed in spaced parallel relation to each other and a pair of transversely extending rails connecting said longitudinal rails together, a plurality of cross members extending transversely of said frrame, means detachably securing the opposite ends of each cross member to said spaced longitudinal rails for selective positioning therealong, at least one support mounted on each of said cross members for selective positioning therealong, each support including a support element having an antifriction glass supporting surface for facilitating sliding

movement of a glass sheet thereon, said support elements providing only line contact bearing surfaces at selectively



spaced intervals for said glass sheet to minimize heat transmission away from the supported glass surface.

4,077,793

COMPOSITION FOR FAVORING GERMINATION AND GROWTH OF THE VEGETABLE SPECIES AND ITS APPLICATION

Rudolf Krupicka, Rodauner Str. 22, 1238 Vienna, Austria

Filed Mar. 28, 1977, Ser. No. 781,637
Int. Cl.[2] C05F *11/08*

U.S. Cl. 71—7 **4 Claims**

1. An improved biological product for actively producing nitrogen enrichment of soil, comprising:

nitrogen fixing soil microorganisms selected from the group comprising azotobacter chroococum, actinomycetes thermophylus, a.o., mixobacter cytophagea, myxobacter cellvibrio.

pytohormones selected from the group comprising B-indolylacetic acid, tryptophan, GA_3, and Skatol, either chemically produced or biologically available in products such as sea weed extracts or microbial extracts,

a high molecular carbohydrate selected from the group comprising lactose and glucose,

a nitrogenous source material selected from the group comprising of urea, casein, albumin or soy proteinate,

and an enzyme catalyst selected from the group comprising titanium and wolfram which are reactive with the enzyme system of the microorganisms in the conversion of the nitrogenous source material into nitrogen compounds which may be utilized nutrients by plants.

4,077,794

METHOD FOR THE MANUFACTURE OF SOIL MODIFIERS FROM WASTE MATERIALS OF THE MANUFACTURE OF TITANIUM DIOXIDE

Luigi Piccolo, and Antonio Paolinelli, both of Milan, Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Mar. 8, 1977, Ser. No. 775,683
Int. Cl.[2] C05D *9/00*

U.S. Cl. 71—31 **7 Claims**

1. A process for producing a soil modifier comprising from 80 to 95% by weight of a mixture of ferric oxide and ferric sulphate in an oxide/sulphate weight ratio of from 0.25:1 to 1:1, which comprises:

(a) an initial step of formation of said soil modifier by calcining at a temperature of from 500° to 600° C, in the presence of an oxidizing gas, a blend of (i) a by-product consisting essentially of ferrous sulphate heptahydrate, obtained in the manufacture of titanium dioxide from ilmenite or ilmenite slags by the sulphate process, and (ii) a material containing at least 80% by weight of ferric sulphate and/or ferric oxide, said calcining being carried out for a period such as to convert from 80 to 95% by weight of said ferrous sulphate into ferric oxide and ferric sulphate and said material being present in said blend in an amount of at least 20 wt.% with respect to said by-product, and

(b) a continuous operation step of production of said soil modifier by continuing said calcining under the conditions of (a), continuously feeding the blend to the calcining zone and continuously discharging the soil modifier from the calcining zone, said material (ii) of said blend being replaced in step (b) by a fraction of the discharged soil modifier which is continuously recycled.

4,077,795

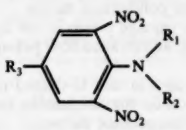
METHOD FOR INHIBITING THE GROWTH OF TOBACCO SUCKERS

Anson Richard Cooke, Hatfield, and George Robert Starke, Perkasie, both of Pa., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 282,879, Aug. 22, 1972, Pat. No. 3,880,643, which is a continuation-in-part of Ser. No. 107,598, Jan. 18, 1971, abandoned. This application Feb. 12, 1975, Ser. No. 549,246
The portion of the term of this patent subsequent to Apr. 29, 1992, has been disclaimed.
Int. Cl.[2] A01N *9/20*

U.S. Cl. 71—78 **18 Claims**

1. A method of inhibiting the growth of suckers on tobacco plants which comprises applying to the tobacco plants an effective amount of a compound of the formula:



wherein R_1 and R_2 are each independently selected from the group consisting of:

(a) hydrogen,
(b) lower alkyl,
(c) halo-substituted-lower alkyl,
(d) lower alkenyl,
(e) alkoxy-lower alkyl, and
(f) monocycloalkyl-lower alkyl, with the proviso that only one of R_1 and R_2 can be branched lower alkyl or branched lower alkenyl;

wherein R_3 is selected from the group consisting of:

(a) halo,
(b) lower alkyl,
(c) halo-substituted-lower alkyl,
(d) methylsulfonyl, and
(e) sulfanilamide;

with the proviso that R_1 and R_2 cannot both be hydrogen and that one of R_1 and R_2 may only be hydrogen when:

(a) R_2 is alkoxy-lower alkyl, or
(b) R_3 is halo-substituted lower alkyl.

4,077,796

TOBACCO SUCKER CONTROL AGENT AND METHOD

Calman J. Kish, North Plainfield, N.J., assignor to Fairmount Chemical Company, Inc., Newark, N.J.

Continuation-in-part of Ser. No. 549,815, Feb. 14, 1975, abandoned. This application Nov. 24, 1976, Ser. No. 744,649
Int. Cl.[2] A01N *5/00*

U.S. Cl. 71—78 **17 Claims**

1. A method for inhibiting the growth of suckers in tobacco plants which comprises applying to said tobacco plants after topping an effective amount for inhibiting tobacco sucker growth of an aqueous solution containing from about 10 to about 40% by weight of a saturated C_6 to C_{18} fatty alcohol and from about 5 to about 25% by weight of a member selected from the group consisting of the alkali metal, alkanolamine

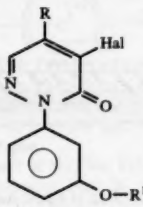
containing up to 12 carbon atoms, and C_2 - C_6 alkylamine salts of 1,2-dihydropyridazine-3,6-dione.

4,077,797
1-POLYFLUOROALKOXYPHENYL-4-SUBSTITUTED-5-HALOPYRIDAZONES-6 AND HERBICIDAL USES THEREOF

Adolf Fischer, deceased, late of Mutterstadt, Germany (by Cecilia Emma Fischer, heiress-at-law); Hanspeter Hansen, Ludwigshafen, and Wolfgang Rohr, Mannheim, both of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed May 26, 1976, Ser. No. 690,266
Claims priority, application Germany, Jun. 14, 1975, 2526643
Int. Cl.² C07D *237/22, 237/16;* **A01N** *9/22*
U.S. Cl. 71—92 **5 Claims**

4. A substituted pyridazone of the formula



wherein Hal is bromo or chloro, R^1 is difluoromethyl and R is methoxy, dimethylamino or methylamino.

5. A process for controlling the growth of unwanted plants among cotton plants wherein the locus of the plants is treated with a phytotoxic amount of a substituted pyridazone selected from the group consisting of

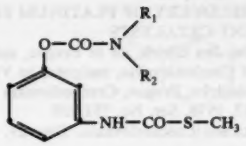
1-(m-tetrafluoroethoxyphenyl)-4-amino-5-chloropyridazone-6,
1-(m-tetrafluoroethoxyphenyl)-4-amino-5-bromopyridazone-6,
1-(m-tetrafluoroethoxyphenyl)-4-methylamino-5-chloropyridaone-6,
1-(m-tetrafluoroethoxyphenyl)-4-methylamino-5-bromopyridaone-6,
1-(m-tetrafluoroethoxyphenyl)-4-dimethylamino-5-chloropyridazone-6,
1-(m-tetrafluoroethoxyphenyl)-4-dimethylamino-5-bromopyridazone-6,
1-(m-tetrafluoroethoxyphenyl)-4-methoxy-5-chloropyridazone-6 and
1-(m-tetrafluoroethoxyphenyl)-4-methoxy-5-bromopyridazone-6.

4,077,798
SELECTIVE HERBICIDES

Friedrich Arndt, Aich, and Gerhard Boroschewski, Berlin, both of Germany, assignors to Schering Aktiengesellschaft, Bergkamen and Berlin, Germany

Continuation of Ser. No. 170,618, Aug. 10, 1971, abandoned. This application Mar. 4, 1974, Ser. No. 447,796
Claims priority, application Germany, Nov. 24, 1970, 2059309
Int. Cl.² A01N *9/12*
U.S. Cl. 71—100 **5 Claims**

1. A method for the selective control of weeds and grasses in the presence of a growing crop of rice plants which comprises applying to said weeds, grasses and plants, without differentiation, a herbicidal composition consisting essentially of a compound having the formula

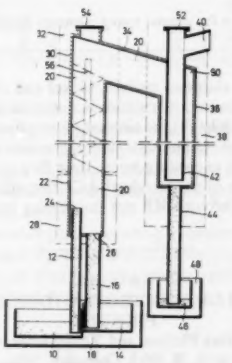


wherein R_1 is an alkyl group having from 1 to 3 carbon atoms and R_2 is selected from the group consisting of phenyl, 2-methylphenyl, 3-methylphenyl, 3-ethylphenyl, 4-ethylphenyl, 3-methoxyphenyl, 4-methoxyphenyl, 3-methylmercaptophenyl, 3-chlorophenyl, 3-fluorophenyl, and 4-fluorophenyl in an amount sufficient to substantially destroy said weeds and grasses without substantial damage to the rice plants.

4,077,799
METHOD AND APPARATUS OF REFINING CRUDE CADMIUM

Hans Wilhelm Wieking, and Karl Ehlers, both of Goslar, Germany, assignors to Preussag Aktiengesellschaft Metall, Goslar, Germany

Continuation of Ser. No. 521,886, Nov. 7, 1974, abandoned. This application Dec. 3, 1976, Ser. No. 747,301
Claims priority, application Germany, Apr. 13, 1974, 2418170
Int. Cl.² C22B *17/00*
U.S. Cl. 75—71 **1 Claim**



1. A method of refining crude cadmium comprising the steps of continuously evaporating liquid crude cadmium under a vacuum, passing said vaporized crude cadmium upwardly through a reflux condenser, condensing impurities having a higher boiling point than cadmium together with a portion of pure cadmium vapor in said reflux condenser, causing the condensate in said reflux condenser to move in counterflow with said crude cadmium vapor, causing the condensed impurities to separate from the condensed crude cadmium and causing the condensed crude cadmium to return to the evaporating crude liquid cadmium, and subsequently condensing the remaining porton of said pure cadmium vapor.

4,077,800
METHOD FOR THE RECOVERY OF PLATINUM FROM SPENT CATALYSTS

Ivo Peka; Ludek Vodicka; Jan Ulrich, all of Prague, and Jan Hajek, Kralupy, all of Czechoslovakia, assignors to Vysoka skola chemicko-technologicka, Prague, Czechoslovakia

Filed Dec. 17, 1976, Ser. No. 751,820

Claims priority, application Czechoslovakia, Dec. 29, 1975, 8997/75

Int. Cl.² C22B *11/04*

U.S. Cl. 75—108 **3 Claims**

1. Method for recovering platinum from spent platinum containing catalysts which comprises the steps of fluorinating the spent catalyst at a temperature within the range of 100°–300° C to yield non-volatile platinum fluoride; decomposing said platinum fluoride with a mineral acid at a temperature within the range of 90°–100° C to yield a solution containing dissolved platinum and reducing said dissolved platinum to metallic platinum.

4,077,801
IRON-CHROMIUM-NICKEL HEAT RESISTANT CASTINGS

Bruce A. Heyer, Mahwah, and Donald L. Huth, Ringwood, both of N.J., assignors to Abex Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 793,848, May 4, 1977, abandoned. This application Aug. 15, 1977, Ser. No. 824,637

Int. Cl.² C22C *30/00, 38/44, 38/48, 38/50*

U.S. Cl. 75—122 **6 Claims**

1. A heat resistant alloy in as-cast form essentially in the configuration required for service, neither worked nor heat treated, said casting consisting of the following elements in weight percent:

Carbon	0.25 to 0.8
Nickel	8 to 62
Chromium	12 to 32
Tungsten	0.05 to not more than about 2
Titanium	0.05 to less than 1
Silicon up to 3.5	
Manganese up to 3	
Niobium up to 2	
Nitrogen up to 0.3	
balance iron except for normal tramp elements deoxidizers and foundry impurities	

wherein (a) the elements carbon, nickel and chromium are so balanced that the microstructure is austenite substantially devoid of ferrite whilst (b) the amount of tungsten combined with titanium is present in amounts which produce a value of creep rupture strength exceeding by at least five percent the creep rupture strength of the standard ACI cast alloys at least over the range HH through HP not containing tungsten and titanium.

4,077,802
SINGLE COLOR ELECTROPHOTOGRAPHIC COPY PROCESS

Leo N. Chapin, Des Plaines, and Young Rhee, Chicago, both of Ill., assignors to A. B. Dick Company, Niles, Ill.

Continuation of Ser. No. 94,124, Dec. 1, 1970, abandoned. This application Jul. 19, 1973, Ser. No. 380,567

Int. Cl.² G03G *13/22*

U.S. Cl. 96—1 R **22 Claims**

1. An electrophotographic single color copy process comprising the steps of applying an electrostatic charge onto the face of a receptor formed of a substrate having on its face a single photoconductive coating comprising a photoconductor, at least one sensitizer which sensitizes the photoconductor to at least a portion of the spectrum of visible light, a binder and a dispersed dye, exposing the charged receptor to an original whereby portions of the photoconductive coating corresponding to the non-imaged areas of the original are discharged leaving a latent electrostatic image on the receptor, developing the exposed receptor with a developing composition containing a toner in the form of a material which, when in an activated state, is a solvent for the dispersed dye or an adhesive for the coating whereby toner is retained on the coating in areas retaining the electrostatic charge, and bringing a copy sheet in surface contact with the coating containing toner on the face thereof in a fluid state to cause transfer of the dispersed dye from the areas retaining the latent electrostatic charge to corresponding areas of the copy sheet.

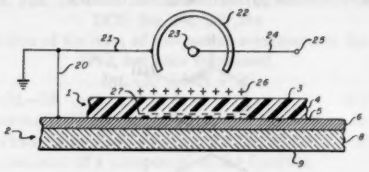
4,077,803
LOW CHARGE-VOLTAGE FROST RECORDING ON A PHOTOSENSITIVE THERMOPLASTIC MEDIUM

Robert L. Gravel, Stow, Mass., assignor to Sperry Rand Corporation, New York, N.Y.

Filed Dec. 1, 1975, Ser. No. 636,779

Int. Cl.² G03G *16/00*

U.S. Cl. 96—1.1 **1 Claim**



1. In a method of recording at a first surface of a single layer of a thermoplastic medium composed of an optically transparent organic resin in the form of a thermoplastic polystyrene having a resistivity at its softening point between substantially 10^{12} and substantially 10^{18} ohm-centimeters and having dispersed therein particles of photosensitive copper phthalocyanine dye responsive to visible radiation, the steps of:

substantially uniformly and directly charging at least a portion of said first surface to a predetermined charge density in a first predetermined period of time substantially lower than the normal thereshold charge density required to produce a frost pattern at said surface in the absence of exposure to visible radiation but in the presence of subsequent exposure to heat,

directly exposing said portion, through a second surface opposite said first surface, after said first predetermined period of time, to visible radiation in the form of an image pattern for a second predetermined period of time, and

directly subjecting said portion during a third predetermined period of time falling within said second predetermined period of time to thermal radiation from planar radiant heater means disposed in spaced substantially parallel relation with respect to said surface, whereby a frost image is generated upon said portion that is an image substantially replicating said image pattern,

said third predetermined period of time falling mainly in the later part of said second predetermined period of time and said second predetermined period of time extending to a time later than the end of said third predetermined period of time.

4,077,804
METHOD OF PRODUCING TONER PARTICLES BY IN-SITU POLYMERIZATION AND IMAGING PROCESS

Edward Vanzo, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Mar. 26, 1975, Ser. No. 562,299

Int. Cl.² G03G *9/08;* C08J *3/20*

U.S. Cl. 96—1 SD **26 Claims**

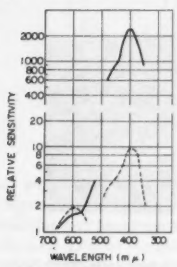
1. A process for producing colored toner particles comprising admixing a colorant with a first organic monomer to form an organic phase; maintaining said organic phase under continuous agitation; admixing a polymerization initiator with said

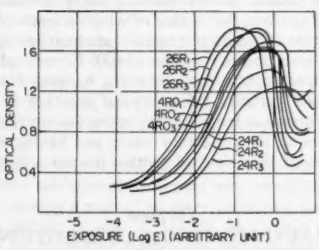
organic phase; admixing said organic phase with an aqueous phase containing a suspending agent therein under polymerization conditions to form a suspension; polymerizing said suspension to provide polymer particles containing said colorant and having a particle size in the range of 1 to about 100 microns; admixing a second monomer of a tough polymer with the polymer particles under continuous agitation for a period of time sufficient to enable the monomer to diffuse into the polymer particles; admixing a water soluble polymerization initiator with the polymer particles under polymerization conditions in said aqueous phase; polymerizing said second monomer; and thereafter recovering the polymer particles.

4,077,805
LIGHT-SENSITIVE COMPOSITION CONTAINING ANTIOXIDANT

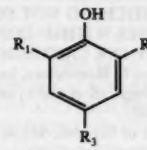
Shirow Asakawa; Yukihiro Saito, and Katsue Hasegawa, all c/o Matsushita Research Institute Inc., No. 4896, Aza Ohtani, Ikuta, Kawasaki, Japan

Continuation-in-part of Ser. No. 518,207, Oct. 25, 1974, abandoned. This application May 26, 1976, Ser. No. 690,105
Int. Cl.[2] G03C *1/58, 1/00*
U.S. Cl. 96—115 P **9 Claims**





1. A light-sensitive composition comprising (1) a dispersed phase in the form of discrete fine particles of a light-sensitive combination of (A) a halogenated hydrocarbon capable of producing free radicals or ions upon exposure to actinic light, the halogen being selected from the group consisting of chlorine, bromine and iodine, (B) N-vinylcarbazole as a compound capable of producing color with said halogenated hydrocarbon under the influence of actinic light, (C) 4-(p-dimethylaminostyryl)-quinoline as a sensitizer, and (D) a phenol derivative, as an additive to prolong the shelf life, having the formula



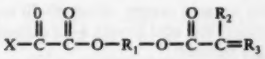
where R_1 and R_2 are individually an alkyl group having 1 to 4 carbon atoms, and R_3 is hydrogen, hydroxyl group, an alkyl group having 1 to 4 carbon atoms or an alkoxyl group having 1 to 4 carbon atoms, the amount of said phenol derivative being from 0.001 to 0.1% by weight of said N-vinylcarbazole, in (2) a solid-film-forming hydrophilic binder in which said dispersed phase is substantially insoluble.

4,077,806
LIGHT SENSITIVE COMPOSITION AND PRODUCTS THEREOF

Thaddeus M. Muzyczko, Melrose Park, and Donald W. Fieder, Wheaton, both of Ill., assignors to The Richardson Company, Des Plaines, Ill.

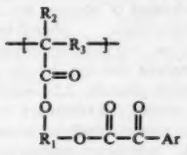
Division of Ser. No. 363,018, May 23, 1973, Pat. No. 3,930,868. This application Oct. 2, 1975, Ser. No. 618,990
Int. Cl.[2] G03C *1/68, 2/78;* **G08F** *1/46;* **C08F** *120/02*
U.S. Cl. 96—115 R **20 Claims**

1. A light sensitive polymer prepared by homo or copolymerization of a compound having the following general structure:



wherein X represents an aromatic or a heterocyclic structure, R_1 represents an alkylene group having from one to ten carbon atoms, R_2 represents a grouping selected from the group consisting of hydrogen and lower alkyl having from one to five carbon atoms, and R_3 represents an alkenyl group having from one to ten carbon atoms.

9. A light sensitive plate including a support member and a film formed from a light sensitive composition, said composition comprising an effective amount of a polymer which includes as a recurring structure:



wherein Ar represents an aromatic selected from the group consisting of phenyl, naphthyl and substituted products of each, R_1 represents an alkylene group having from one to ten carbon atoms, R_2 represents a grouping selected from the group consisting of hydrogen and lower alkyl having from one to five carbon atoms, and R_3 represents an alkylene group having from one to ten carbon atoms.

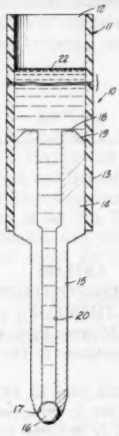
4,077,807
BALL PEN INKS WHICH DO NOT FORM CLOGGING CRYSTALLINE MASSES WITHIN COPPER OR COPPER ALLOY INK CARTRIDGES

Steven H. Kramer; Glenn F. Roquemore, both of Escondido, and James J. Joyce, Saratoga, all of Calif., assignors to Gordon S. Lacy, Escondido, Calif.

Continuation-in-part of Ser. No. 551,401, Feb. 20, 1975, abandoned, which is a continuation-in-part of Ser. No. 325,721, Jan. 29, 1973, abandoned, which is a continuation-in-part of Ser. No. 231,701, Mar. 3, 1972, abandoned. This application Jun. 28, 1976, Ser. No. 700,077

Int. Cl.² C09D *11/04*

U.S. Cl. 106—24 **7 Claims**



1. An improved ball pen ink which is substantially non-corrosive to copper or copper alloy in a ball pen cartridge in the presence of oxygen and moisture, which ink is free of copper or copper alloy particles, and which ink consists essentially of:

a. liquid polar organic carrier, about 30–70 weight percent;

b. carrier soluble fatty acid having 4–20 carbon atoms, about 1–25 weight percent;

c. about 5–50 weight percent of carrier soluble resin selected from the class consisting of coal tar, coumarone, coumarone-indene, phenol-modified-coumarone, phenol-modified-coumarone-indene, hexanetriol phthalate resin, ketone condensate, ketone-aldehyde condensate, pine tar, polyvinylpyrrolidone, zein, and mixtures thereof;

d. dye, pigment, or mixtures thereof, in an amount suitable for producing the desired colored line; and

e. carrier soluble additive from the class of (1) antioxidants, (2) corrosion inhibitors, and (3) mixtures thereof,

where said (1) antioxidants are selected from the group consisting of octylated diphenylamine, isopropoxy diphenylamine, condensate of acetone and diphenylamine, aldol-alpha-naphthylamine, phenyl-beta-naphthylamine, dicyclohexylamine, diaryl-paraphenylene diamine, alkylaryl-para-diphenylene diamine, 2,2-methylene-bis-(4-methyl-6-tertiary butyl phenol), 2,2-methylene-bis-(4-ethyl-6-tertiary butyl phenol, 2,6-ditertiary butyl-4-methyl phenol, styrenated phenol, hindered phenol, polymeric hindered phenol, lauryl-para-aminophenol, stearyl-para-aminophenol, N-acetyl-para-aminophenol, N-butyryl-para-phenol, 2,2-thiobis-(4-methyl-6-tertiary-butyl phenol). 1,1-thiobis-(2-naphthol), hydroquinone, 2,5-ditertiary butylhydroquinone, 2,5-ditertiary amylhydroguinone, monotertiarybutyl hydroquinone, hydroquinone monomethyl ether, hydroquinonemonobenzyl ether, octadecyl-3-(3′,5′-ditertiary butyl-4′)-hydroxy phenyl propionate, dilauryl propionate, ditertiary butylthiodipropionate, butylated hydroxyanisole, 4-dodecyloxy-2-hydroxybenzophenone, and polymerized tirmethyl dihydroquinoline, and said (2) corrosion inhibitors are selected from the group consisting of sorbitan fatty acid ester, trimer acid, nonyl phenoxy acetic acid, N,N′-disalicylol-1,2-propanediamine, bis(octylphenyl) hydrogen phosphate diethylamine, octylphenyldihydrogen phosphate diethylamine, mixtures of said diethylamine salts, mercaptobenzothiazole, sodium-2-mercaptobenzothiazole, 2-phenylbenzothiazole, zinc dibutyl dithiocarbamate and mixtures thereof.

where said antioxidant, when present, is present in an amount of about 0.5–10 weight percent,

where said corrosion inhibitor, when present, is present in an amount of about 0.1-5 weight percent, and

said weight percents of antioxidant and corrosion inhibitor are based on the weight of the ink components: carrier, fatty acid, resin, dye and pigment.

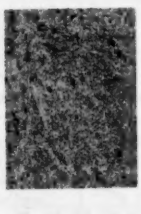
4,077,808
CHROMIA-BONDED REFRACTORY BODY DEVOID OF VITREOUS AND SINTERED BONDING

Peter K. Church, Cascade, and Oliver J. Knutson, Colorado Springs, both of Colo., assignors to Kaman Sciences Corporation, Colorado Springs, Colo.

Continuation of Ser. No. 393,631, Aug. 31, 1973, abandoned, which is a division of Ser. No. 694,303, Dec. 28, 1967, Pat. No. 3,789,096, which is a continuation-in-part of Ser. No. 642,704, Jun. 1, 1967, abandoned. This application Aug. 4, 1975, Ser. No. 601,510

Int. Cl.² C04B *35/12, 41/24*

U.S. Cl. 106—40 R **2 Claims**



1. A chemically hardened refractory body comprising:

a closely packed porous mass of finely divided discrete particles at least the surface of which consists of a refractory oxide of at least one metallic element having a vitrification temperature in excess of 600° F. essentially devoid of vitreous and/or sinter bonding between the particles with said particles being bonded together by chromic oxide formed at temperatures below the vitrification temperature of the refractory oxide and having substantial deposits of chromic oxide within the pores thereof.

4,077,809
CELLULAR CEMENTITIOUS COMPOSITIONS AND METHOD OF PRODUCING SAME

Mark Plunguian, 6912 Columbia Dr., and Charles E. Cornwell, 4104 Marlan Dr., both of Alexandria, Va. 22307

Continuation-in-part of Ser. No. 501,573, Aug. 20, 1974, abandoned, and Ser. No. 585,496, Jun. 10, 1975, abandoned. This application Sep. 23, 1976, Ser. No. 725,787

Int. Cl.² C04B *21/00*

U.S. Cl. 106—88 **7 Claims**

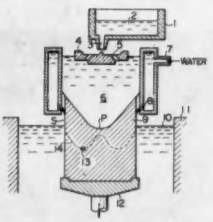
1. A cellular cementitious composition comprising about 100 parts by weight of a mineral cement selected from the group consisting of portland cement, calcium aluminate cement, and gypsum cement, about 10–350 parts by weight of a mineral aggregate, about 0.1–2.0 parts by weight of a water-soluble organic film-former selected from the group (comprising) consisting of guar gum, xanthan gum, and protein colloids,

about 0–50 parts by weight of pozzolonic fly ash, about 0–15 parts by weight of chopped fiber glass and fiber glass fabric, about 0.1–3.0 parts by weight of foam-producing synthetic surface active agents selected from the group (comprising) consisting of anionic and nonionic surface active agents and mixtures thereof, about 0.3–1.2 parts by weight of an emulsion of a synthetic resin having a glass transition temperature of 10–25° C, said emulsion having equivalent 0.15–0.66 parts by weight of synthetic resin solids, about 35–150 parts by weight of water, and at least 8 percent by volume of air incorporated into the composition, exclusive of any air in the aggregate.

4,077,810
ALUMINUM ALLOYS HAVING IMPROVED MECHANICAL PROPERTIES AND WORKABILITY AND METHOD OF MAKING SAME

Yasushi Ohuchi, Katsuta; Takeo Tamamura, Hitachi; Naotatsu Asahi, Hitachi; Makoto Nakayama, Hitachi; Hisanobu Kanamaru, Katsuta; Arinobu Hamada, Yokohama; Yasuhiro Takahashi, Yokohama; Kozo Tabata, Mitaka, and Ryota Mitamura, Yokohama, all of Japan, assignors to Hitachi, Ltd. and Showa Denko K.K., both of, Japan

Filed Apr. 10, 1975, Ser. No. 567,009
Claims priority, application Japan, Apr. 20, 1974, 49-44851
Int. Cl.² C22F *1/04*
U.S. Cl. 148—2 **23 Claims**



1. A cast product which provides an aluminum-silicon alloy having markedly improved mechanical properties and machinability by plastic working and heat treatment, said cast product consisting essentially of 8–15% by weight of silicon, 1–4.5% by weight of copper, 0.05–0.7% by weight of magnesium and the balance being substantially aluminum, said cast product further characterized by tabular or flaky silicon crystal in eutectic structure having a mean width of not greater than 5μm and being finely and homogeneously dispersed in an aluminum matrix, and the area ratio of primary silicon crystal in the aluminum matrix being not greater than 6% and the maximum grain size of said primary silicon crystal being not greater than 50 μm.

10. A method for producing an aluminum-silicon alloy having improved mechanical properties and workability which comprises pouring a melt of an alloy consisting essentially of 8–15% by weight of silicon, 1–4.5% by weight of copper, 0.05–0.7% by weight of magnesium and the balance being substantially aluminum into a water cooling mold, solidifying at least a surface portion thereof in the mold to produce an ingot, continuously taking out the ingot from the bottom of the mold, simultaneously cooling the taken-out ingot by jetting water to the surface of the ingot, the solid cooling rate of the ingot being kept at 10° C/sec. or higher to crystallize tabular or flaky silicon crystal having a mean width of not more than 5 μm in eutectic structure in an aluminum matrix and to crystallize primary silicon crystal having a maximum grain size not greater than 50 μm in the aluminum matrix, the area ratio of said primary silicon crystal crystallized in the aluminum matrix being not greater than 6%, then subjecting a thus obtained cast product to a plastic working of at least 30% in a working ratio without causing increase in width of said silicon crystal in eutectic structure and heat treating said plastic worked product.

4,077,811
PROCESS FOR "BLACK FABRICATION" OF MOLYBDENUM AND MOLYBDENUM ALLOY WROUGHT PRODUCTS

Russell W. Burman, Mentor, Ohio, assignor to AMAX, Inc., Greenwich, Conn.

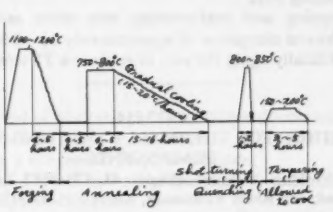
Filed Mar. 1, 1977, Ser. No. 773,206
Int. Cl.² C22F *1/18*
U.S. Cl. 148—11.5 F **13 Claims**

1. A process for the fabrication of molybdenum-base wrought products which comprise the steps of providing a molybdenum material containing at least 50% molybdenum in a substantially fully annealed condition, warming the said material to a temperature in the range of about 500° to about 1200° F, deforming the warmed said material into a wrought product.

4,077,812
METHOD OF WORKING STEEL MACHINE PARTS INCLUDING MACHINING DURING QUENCH COOLING

Hajime Tani, Kuwana, Japan, assignor to NTN Toyo Bearing Co. Ltd., Osaka, Japan

Filed Mar. 22, 1976, Ser. No. 669,146
Claims priority, application Japan, Mar. 25, 1975, 50-36291; Mar. 25, 1975, 50-36292; Mar. 25, 1975, 50-36293
Int. Cl.² C21D *1/20, 1/22*
U.S. Cl. 148—12.4 **7 Claims**



1. A method of working steel machine parts comprising uniformly heating a steel bank to an elevated temperature in the range 950°–1300° C, subjecting the heated steel blank at the elevated temperature to a plastic working operation to produce a steel blank suitable for use as a steel machine part, continuously cooling the worked steel blank from the working temperature to a temperature in the range 700°–850° C, subjecting the cooled steel blank to isothermal retention in the cooled temperature range for spheroidization of cementite, uniformly heating the cooled steel blank to a predetermined quenching temperature, said quenching temperature being selected in accordance with the kind of steel used for the blank, placing the heated steel blank in a cooling medium and quickly quench cooling the steel blank to a temperature in the vicinity of the Ms point of the steel, subjecting the cooled steel blank to a machining or cutting operation while the steel blank is at a temperature preceding the temperature at which hardening will occur, and thereafter permitting the worked steel blank to cool to room temperature.

4,077,813
METHOD OF PRODUCING COMPLEX ALUMINUM ALLOY PARTS OF HIGH TEMPER, AND PRODUCTS THEREOF

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of and Irvin J. Wilson, Rancho Palos Verdes, Calif.

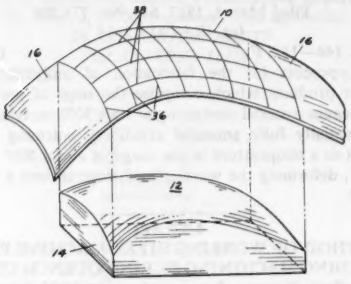
Filed Jul. 26, 1976, Ser. No. 708,771
Int. Cl.² C22D *1/04*
U.S. Cl. 148—12.7 A **1 Claim**

1. A process for producing an aluminum alloy part of intri-

cate design and very high temper and stress corrosion resistance comprising the steps of:

a. forming said part from annealed aluminum alloy to essentially its final shape and dimensions by one of the standard forming operations, such step incidentally causing some work-hardening of said part;

b. making the surface of said part with mutually orthogonal grid lines;



c. solution-heat-treating said part to again induce an annealed condition therein;

d. cold-working said part while in its annealed condition by repeating said forming operation;

e. monitoring elongation of said grid lines during said cold-working step;

f. stopping said cold-working step when said part has achieved elongation of approximately 1½ – 2%; and

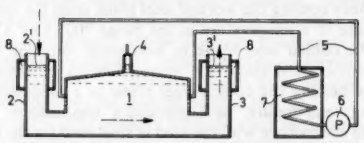
g. artificially aging the part to achieve a T8 temper.

4,077,814

METHOD FOR THERMALLY TREATING METAL COMPONENTS

Alfred Kreidler, Wehrenbachhalde 41, CH-8053 Zurich, Switzerland, and Klaus Viessmann, Kurze Str., D-7151 Marbach-Rielingshausen, Germany

Division of Ser. No. 387,278, Aug. 10, 1973, Pat. No. 3,964,734. This application Mar. 19, 1976, Ser. No. 668,744
Claims priority, application Germany, Aug. 11, 1972, 2239552
Int. Cl.² C22F *1/08*
U.S. Cl. 148—13.2 **13 Claims**



1. In a method for thermal treatment such as annealing wherein metal components are subjected in relatively large numbers and in a relatively short time to the effects of a mineral oil bath which is at an elevated temperature, the steps of immersing the metal components in a bath of mineral oil which is at a temperature of between 200° and 300° C, continuously moving the thus-immersed metal components through the bath while the metal components remain immersed therein, and then removing the metal components from the bath, wherein the improvement comprises maintaining the bath of mineral oil closed off from the outer air, and introducing the components into the bath and removing them from the bath through seals having oil in contact with the outer atmosphere and at a temperature which is less than 200° C, whereby the bath can be maintained in an effective operating condition over a long period of time.

4,077,815

WATER SOLUBLE FLUX

Philipp William Hans Schuessler, Endwell, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 20, 1976, Ser. No. 752,337
Int. Cl.² B23K *35/34*
U.S. Cl. 148—23 **6 Claims**

1. A water soluble fluxing composition which comprises:

from about 90 to 99.5 percent by weight of composition of a vehicle portion consisting essentially of block copolymers of polyoxyethylene and polyoxypropylene and trimethylol derivatives thereof, and

from about 0.5 to 10 percent by weight of composition of an activator portion selected from the group consisting of tetrakis hydroxyalkyl derivatives of alkylene diamines, long chain alkyldiethyanolamines where the alkyl group contains from about 12 to 18 carbon atoms, and mixtures thereof.

4,077,816

DISPERSION-STRENGTHENED METALS

Anil V. Nadkarni, Mentor, Ohio, assignor to SCM Corporation, New York, N.Y.

Division of Ser. No. 384,028, Jul. 30, 1973, Pat. No. 3,893,844. This application Jan. 23, 1975, Ser. No. 543,425
Int. Cl.² B22F *3/00, 1/00*
U.S. Cl. 148—126 **2 Claims**

1. In a process for dispersion strengthening metal including the steps of providing a powdered alloy of relatively noble matrix metal and solute metal, the matrix metal having a relatively low free energy oxide formation and the solute metal having a relatively high negative free energy of oxide formation, and the step of internally oxidizing said powdered alloy, the improvement comprising:

increasing the grain size of said alloy prior to the step of internal oxidation at recrystallizing temperatures of said alloy in an inert atmosphere for time sufficient to increase the grain size of said alloy to a grain size of at least Grain Size No. 6 as measured by ASTM E-112.

2. A process for dispersion strengthening of metal by internal oxidation comprising:

providing a powdered alloy having an average particle size of less than 300 microns comprising a matrix metal and a solute metal, said matrix metal having a negative free energy of oxide formation at 25° C. of up to 70 kilocalories per gram atom of oxygen, said solute metal having a negative free energy of oxide formation exceeding the negative free energy of oxide formation of said matrix metal by at least about 60 kilocalories per gram atom of oxygen at 25° C.;

heating said powdered alloy within an inert atmosphere at a temperature and for time sufficient to increase the grain size of said alloy to a grain size of at least Grain Size No. 6 as measured by ASTM Test E-112;

providing an oxidant comprising an intimate interspersion of in situ heat-reducible metal oxide and a finely divided hard refractory metal oxide, said heat-reducible metal oxide having a negative free energy of formation at 25° C. of up

to 70 kilocalories per gram atom of oxygen, said refractory metal oxide having a negative free energy of formation exceeding the negative free energy of formation of said heat-reducible metal oxide by at least about 60 kilocalories per gram atom of oxygen at 25° C.;

combining into an intimate mixture at least about 0.1 weight parts of said oxidant with 100 weight parts of said alloy, said oxidant having the heat-reducible metal oxide present in at least stoichiometric proportion for complete internal oxidation of all of said solute metal in said alloy;

internally oxidizing said alloy mixed with said oxidant by heating to oxidize the solute metal of said alloy and to form a residue of heat reducible metal oxide of said oxidant; and

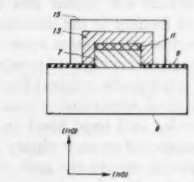
thermally coalescing said internally oxidized alloy and said residue into a dispersion-strengthened metal stock.

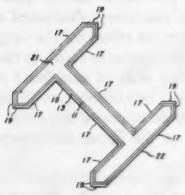
4,077,817

MAKING A SEMICONDUCTOR LASER STRUCTURE BY LIQUID PHASE EPITAXY

David W. Bellavance, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Continuation of Ser. No. 645,776, Dec. 31, 1975, abandoned. This application Apr. 4, 1977, Ser. No. 784,399
Int. Cl.² H01L *21/208*
U.S. Cl. 148—171 **4 Claims**





1. A method of fabricating a semiconductor laser comprising the steps of:

depositing a mask on a substrate of group III-V semiconductor material having a (100) orientation;

defining a window in said mask, said window having an elongated central pattern and cross-bar pattern at each end of and perpendicular to the axis of said elongated central pattern, said axis of said elongated central member oriented in a (100) direction; and

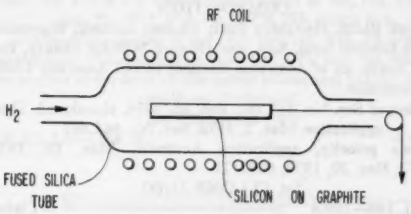
fabricating by selective liquid phase epitaxy a mesa of semiconductor material on said substrate in the window defined in said mask, said mesa having a flat top parallel to said substrate and oppositely spaced (100) crystallographic facets perpendicular to said substrate and parallel to one another, said crystallographic facets; forming the reflecting mirrors of a longitudinal lasing cavity.

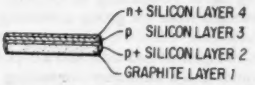
4,077,818

PROCESS FOR UTILIZING LOW-COST GRAPHITE SUBSTRATES FOR POLYCRYSTALLINE SOLAR CELLS

Ting L. Chu, Dallas, Tex., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Continuation-in-part of Ser. No. 576,488, May 12, 1975, Pat. No. 3,961,997. This application Jun. 4, 1976, Ser. No. 693,074
Int. Cl.² H01L *21/20, 21/324, 21/84*
U.S. Cl. 148—174 **10 Claims**





1. A method of fabricating polycrystalline silicon solar cells, which comprises:

providing a roughened graphite substrate;

depositing a low resistivity polycrystalline silicon layer on the roughened graphite;

recrystallizing the polycrystalline silicon layer by melting and solidification; and

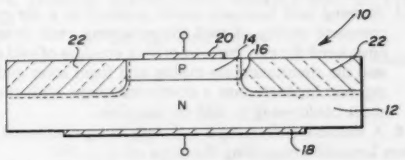
depositing successive layers of polycrystalline silicon containing appropriate dopants on said low resistivity polycrystalline silicon layer such that p-n junction devices are formed which effectively convert solar energy to electrical energy.

4,077,819

TECHNIQUE FOR PASSIVATING SEMICONDUCTOR DEVICES

Jearld L. Hutson, P.O. Box 34235, Dallas, Tex. 75234

Division of Ser. No. 569,704, April 21, 1975, Pat. No. 4,007,476. This application Sep. 9, 1976, Ser. No. 721,778
Int. Cl.² H01L *21/225*
U.S. Cl. 148—188 **5 Claims**



1. The method of passivating a silicon semiconductor device comprising:

exposing a P-N junction in a multilayered silicon semiconductor body,

forming a mixture of glass and a quantity of carrier lifetime degrading material selected from a group comprising gold and platinum,

applying the mixture to the exposed P-N junction, and

firing the mixture to fuse the glass and material on the silicon semiconductor body to enhance the voltage capacity and stability of the exposed P-N junction.

4,077,820
GELLED-WATER BEARING EXPLOSIVE COMPOSITION

Frederick Bolza, Hawthorn East; Thomas Jellinek, Ripponlea; Keith Gordon Neill, Kew, and Howard William Tankey, Box Hill North, all of Australia, assignor to ICI Australia Limited, Australia

Division of Ser. No. 445,782, Feb. 25, 1974, abandoned. This application Mar. 2, 1976, Ser. No. 663,107

Claims priority, application Australia, Mar. 19, 1973, 2656/73; Dec. 20, 1973, 6077/73

Int. Cl.² C06B *23/00*

U.S. Cl. 149—109.4 **6 Claims**

1. A gelled water-bearing explosive composition comprising at least one water soluble inorganic oxygen releasing salt, at least one fuel, from 5 to 35% by weight of water; and 0.1 to 5% by weight of a gelling agent comprising an organic metallic complex of a metal selected from the group consisting of zinc, cerium, aluminum, uranium, titanium, zirconium, lead, tin, vanadium, chromium, manganese and iron, and a copolymer of a water-soluble monomer and a monomer containing a bidentate group which contains two donor groups which forms with a metal, a chelate ring.

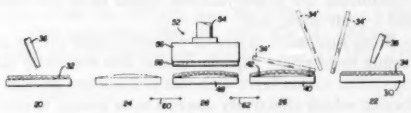
4,077,821
METHOD OF FORMING FOAM LAMINATE AND HEADLINERS

Ralph G. Doerfling, Southfield, Mich., assignor to Detroit Gasket Company, Oak Park, Mich.

Filed Sep. 15, 1975, Ser. No. 613,723

Int. Cl.² B29D *27/04*

U.S. Cl. 156—79 **8 Claims**



1. The method of forming a contoured foam laminate, comprising the steps of:

a. stretching and retaining a flexible finish sheet over an upwardly facing contoured die member;

b. spraying a flexible open cell foamable thermosetting resin reaction mixture on the top face of a flexible self-supporting relatively flat impervious sheet;

c. reversing and overlaying said stretched flexible sheet with said top face of said impervious sheet, said reaction mixture foaming and forming a laminate with said foam layer located between said sheets; and

d. forming said laminate under pressure in a die prior to complete curing of said thermosetting resin foam, said contoured die member comprising one face of said die and said die simultaneously curing said foam layer and forming said laminate into a contoured shape with the finish sheet conforming to said die member.

6. A method of forming a self-supporting contoured plastic foam laminate comprising the steps of:

a. laminating a corrugated paper sheet to a second relatively flat sheet,

b. applying a fluid foamable thermosetting resin reaction mixture over the corrugated face of said paper sheet, said sheet having a relatively smooth exterior paper sheet and a corrugated paper sheet bonded to said smooth sheet at the corrugations and said corrugations projecting upwardly, the fluid plastic foam flowing between said corrugations to form a continuous bond and said foam extending above the corrugations providing a relatively smooth surface defined by said reaction mixture,

c. permitting the foamable thermosetting resin reaction mixture to foam and applying a relatively smooth finish sheet over said exterior surface of the thermosetting resin foam prior to curing the foam, forming opposed relatively smooth exterior surfaces, and

d. curing the foam layer by heating the laminate.

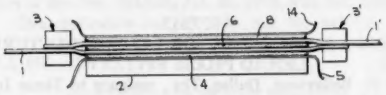
4,077,822
SPLICE FOR USE DURING THE THERMAL STABILIZATION OF A FLAT MULTIFILAMENT BAND OF AN ACRYLIC FIBROUS MATERIAL COMPRISING AT LEAST TWO SEGMENTS

John R. Logwin, Somerset, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Nov. 17, 1976, Ser. No. 742,384

Int. Cl.² B31F *5/00*

U.S. Cl. 156—157 **23 Claims**



1. In a process for the thermal stabilization of a substantially flat multifilament band of an acrylic fibrous material wherein the ends of at least two discrete band segments each having an upper and lower surface are joined and continuously are passed in a successive manner in the direction of their length through a heated thermal stabilization zone, thereby inducing an exothermic cyclization reaction of pendant nitrile groups present thereon and wherein the original fibrous configuration of the same is maintained substantially intact for a residence time sufficient to render said band black in appearance, and non-burning when subjected to an ordinary match flame; the improvement comprising joining the ends of at least two of said band segments by bonding the substantially flat surfaces of said band segments together with a silicone rubber adhesive in a manner sufficient to provide a flexible splice, through which the exothermic heat of reaction is dissipated to an extent sufficient to avoid a deleterious effect on the original fibrous configuration which might otherwise result in the absence of such dissipation, wherein the ends of said band segments are disposed in an overlapped relationship with each of said band segments extending in an opposite direction with the silicone rubber being present on the upper and lower surfaces of said overlapping ends.

22. In a process for the thermal stabilization of a substantially flat multifilament band of an acrylic fibrous material wherein the ends of at least two discrete band segments each having an upper and lower surface are joined and continuously are passed in a successive manner in the direction of their length through a heated thermal stabilization zone, thereby inducing an exothermic cyclization reaction of pendant nitrile groups present thereon and wherein the original fibrous configuration of the same is maintained substantially intact for a residence time sufficient to render said band black in appearance, and non-burning when subjected to an ordinary match flame; the improvement comprising joining the ends of at least two of said band segments by

(a) placing the end of one of said substantially flat band segments over a flat support,

(b) applying a tension across said end of the band segment in a manner sufficient to suspend said end slightly above the support,

(c) applying a room temperature vulcanizable silicone rubber to the lower surface of the end of said band segment

between said surface and said support in a manner sufficient to avoid bonding of said silicone rubber to said support,

(d) applying pressure to the surface of the end of said band segment having the silicone rubber present thereon to insure band wetting,

(e) applying a room temperature vulcanizable silicone rubber to the upper surface of the end of the previously treated band segment in a manner sufficient to deposit said silicone rubber over an area which is substantially coextensive with, and corresponds to the surface covered by the silicone rubber present on said lower surface,

(f) re-applying pressure to the surface of the end of the band segment having the silicone rubber present on its upper and lower surface to insure band wetting,

(g) overlapping the end of a second substantially flat band segment with the previously treated end of the band segment of step (f) with each of said band segments extending in an opposite direction,

(h) applying said room temperature vulcanizable silicone rubber to the upper surface of the second band segment in a manner sufficient to deposit said silicone rubber over an area which is substantially coextensive with, and corresponds to, the area covered by the silicone rubber as provided in step (c),

(i) subjecting said overlapping ends of each band segment to pressure in a manner sufficient to compress the overlapping ends against said support whereby said overlapping ends are bonded together by said room temperature vulcanizable silicone rubber to form a flexible splice through which the exothermic heat of reaction is dissipated to an extent sufficient to avoid a deleterious effect on the original fibrous configuration which might otherwise result in the absence of such dissipation.

4,077,823

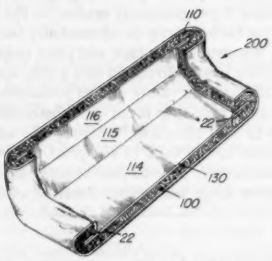
METHOD OF PRODUCING A GUARDING COVER FOR RACKS AND THE LIKE

John T. Wright, Cattaraugus, N.Y., assignor to Champion International Corporation, Stamford, Conn.

Continuation of Ser. No. 630,299, Nov. 10, 1975. This application Mar. 24, 1977, Ser. No. 780,848

Int. Cl.² B31F *1/00*

U.S. Cl. 156—212 **3 Claims**



1. A method for producing a guarding cover for baggage racks comprising:

adhesively laminating a pre-fabricated foamed blanket layer to a relatively stiff, substantially flat, base sheet to form a sandwich, said blanket layer and base sheet being substantially identical in configuration, said blanket layer forming the exterior surface of said guarding cover;

reverse bending the longitudinal ends of said sandwich against the base sheet to form two rigid hem portions, said hem portions including first and second foamed layers and two base sheet layers enclosed between said foamed layers; and

pressing said hemmed sandwich into a plurality of angularly spaced longitudinal panels.

4,077,824

METHOD FOR PRODUCING A BUSINESS FORM ARTICLE

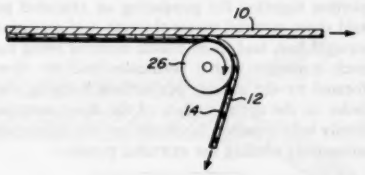
William T. Paulson, Kettering, Ohio; David M. Davidson, deceased, late of Dayton, Ohio (by Clara A. Davidson, executrix); L. Eldean Gilbert, West Milton, Ohio; Henry Gabbard, Xenia, Ohio, and Richard D. Bemus, Troy, Ohio, assignors to The Standard Register Company, Dayton, Ohio

Division of Ser. No. 518,524, Oct. 29, 1974, Pat. No. 3,975,559, which is a division of Ser. No. 378,547, Jul. 12, 1973, Pat. No. 3,850,729, which is a continuation-in-part of Ser. No. 156,704, Jun. 25, 1971, Pat. No. 3,776,755, which is a continuation-in-part of Ser. No. 800,167, Feb. 18, 1969, abandoned. This application Apr. 26, 1976, Ser. No. 680,528

The portion of the term of this patent subsequent to Dec. 4, 1990, has been disclaimed.

Int. Cl.² B41M *5/00*

U.S. Cl. 156—244.24 **4 Claims**



1. A method for producing a business form article, comprising the steps of directing a carrier web along a predetermined path, extruding a heated film of plastics material onto the carrier web, forming the film of plastics material on the carrier web to a film thickness less than 0.0005 inch, controlling the bonding of the extruded film to the carrier web to produce a releasable self-bond between the film and the carrier web, coating a layer of image transfer material onto at least a portion of the film on the carrier web, stripping the extruded film and combined coated layer of image transfer material from the carrier web, and directing the combined film and layer of image transfer material into engagement with a paper record web with the layer of image transfer material disposed between the film and the record web.

4,077,825

METHOD OF PRODUCING A FLEXIBLE NON-SKID STRIP

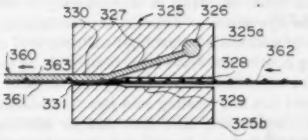
Hiromitsu Naka, No. 39, Oaza Shinmachi, Yashioshi Saitama-ken, Japan

Continuation of Ser. No. 557,887, Mar. 12, 1975, abandoned, which is a division of Ser. No. 483,005, Jun. 25, 1974, abandoned. This application Nov. 15, 1976, Ser. No. 742,114

Claims priority, application Japan, Jul. 6, 1973, 48-79785; Jul. 6, 1973, 48-79786; Jul. 6, 1973, 48-79787; Aug. 11, 1973, 48-94004; Aug. 17, 1973, 48-96158; Oct. 24, 1973, 48-122792; Oct. 24, 1973, 48-122793; Feb. 19, 1974, 49-19128; Feb. 19, 1974, 49-19129; Feb. 21, 1974, 49-20201; Feb. 21, 1974, 49-20202; Apr. 15, 1974, 49-41010; Apr. 15, 1974, 49-41011; Apr. 15, 1974, 49-41012

Int. Cl.² B29D *7/02*

U.S. Cl. 156—244.18 **5 Claims**



1. A process for continuously producing a flexible non-skid

extruded strip having a lower layer and an upper non-skid layer consisting essentially of the steps of:

continuously forming a plurality of spaced holes in the longitudinal direction of a continuous length of sheet material selected from the group consisting of aluminum, copper, steel and stainless steel, said holes being produced in such a manner that there is formed arcuate projections bridging each of the holes on the upper surface of the sheet material so as to define a plurality of open cavities between the arcuate projections and holes;

continuously heating the continuous sheet material having the holes with arcuate projections produced above;

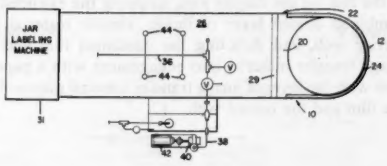
continuously extruding a fused plastic material onto the upper surface of said sheet material in an extrusion die for forming said upper non-skid layer thereon integrally including a main body provided with a non-skid top surface portion, a forward edge anchoring portion and a connection portion connecting said main body and anchoring portion together for producing an extruded product as said sheet material passes through said extrusion die in a straight line, said fused plastic material being extruded in such a manner that it permeates into the open cavities formed by the arcuate projections bridging each of the holes on the upper surface of the sheet material so as to firmly hold together the plastic and the sheet material; and

continuously cooling the extruded product.

4,077,826
APPARATUS FOR HANDLING GLASS JARS

Robert B. Lind, Oakland, Calif., assignor to Gerber Products Company, Fremont, Mich.

Continuation of Ser. No. 166,885, Jul. 28, 1971, abandoned.
This application Jun. 23, 1975, Ser. No. 589,159
Int. Cl.² B65C *03/06;* B32B *17/06;* B65B *21/04*
U.S. Cl. 156—350 **2 Claims**



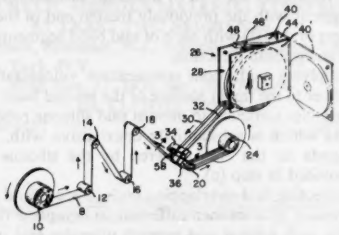
1. In an apparatus for processing externally soiled, cooled, filled glass jars of the type having a closure cap, said jars having been stored during cooling in stacked layers in a retort crate, the apparatus including a retort unloading station, a jar labeling station, a conveyor belt extending between the unloading station and the labeling station, means for moving said conveyor belt at a predetermined speed; means located at the retort unloading station for transferring successive layers of said jars from said retort crate to said conveyor belt so as to provide a continuous supply of said jars thereto; means located at said jar labeling station for applying labels to the surface of said jars, the improvement comprising:

a jar heating and cleaning station positioned along the path of said conveyor belt closely adjacent said jar labeling station, said heating and cleaning station including means to heat a cleaning fluid to substantially 200° F, a quantity of said fluid, an array of downwardly projecting spray nozzles operative to disperse an overlapping continuous spray of said heated cleaning fluid onto said caps and jars during continuous movement thereof along said conveyor belt for simultaneously cleaning the surfaces of said caps and said jars and heating said jars substantially above the room temperature, such that said jar labeling station receives said jars in a heated and cleaned state for securing labels thereto, means for circulating cleaning fluid from said heating means to said spray nozzles, and sufficient of said cleaning fluid to provide said continuous overlapping spray.

4,077,827
APPARATUS FOR PRODUCING A ROLL OF PHOTOGRAPHIC FILM PRINTS HAVING ADHESIVE TRANSFER TAPE BACKING

Herman L. Jones, 7302 - 84th St., NE., Marysville, Wash. 98720, and John H. Haugen, 9925 Davies Rd., Lake Stevens, Wash. 98258

Filed Jan. 6, 1975, Ser. No. 538,544
Int. Cl.² B32B *31/00;* B31F *5/00*
U.S. Cl. 156—352 **11 Claims**



1. Apparatus for producing a roll of photographic film prints having adhesive transfer tape backing composed of a transferable pressure sensitive adhesive layer and a releasable backing strip, the apparatus comprising: tape dispensing means for dispensing a continuous strip of adhesive transfer tape conjointly with movement of a continuous strip of photographic film prints along a run, guide means for directing the tape strip toward the run in a course of travel along which the tape strip is confined and guided, applicator means adjacent the run for receiving the tape strip from said guide means and progressively applying the tape strip to the back of the print strip as the print strip is drawn along the run, and take-up means for simultaneously winding the tape and print strips into a roll, said applicator means providing a curved surface about which the tape and print strips can be curved simultaneously in a direction corresponding to the direction in which said take-up means wind the tape and print strips into a roll such that the adhesive layer is progressively applied to the back of the print strip with the backing strip in substantially face-to-face registry therewith, whereupon the tape and print strips may be wound simultaneously in said direction into a roll, said curved surface being of sufficient curvature and so positioned with respect to the run that the tape strip is curved substantially more than the print strip in said direction, whereby the adhesive layer remains secured to the back of the print strip with the backing strip in substantially face-to-face registry therewith when the tape and print strips are wound simultaneously into the roll.

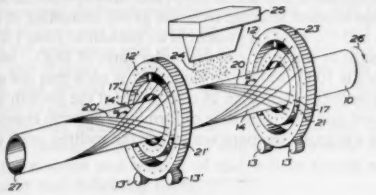
4,077,828
MACHINE FOR MANUFACTURING REINFORCED TUBES

Torsten Erik Theodor Ström, Fristad, Sweden, assignor to AB Gustavsberg, Fristad, Sweden

Filed Sep. 30, 1976, Ser. No. 728,280
Int. Cl.² B65H *81/00*
U.S. Cl. 156—429 **4 Claims**

1. In a machine for manufacturing reinforced tubes comprising a mandrel and means for supplying reinforcement threads having a number of thread-supply locations distributed around the mandrel, the envelop surface of the mandrel and the thread-supply means being rotatable coaxially and displaceable axially in relation to each other for continuous reinforcement of the tube being manufactured on the mandrel, the improvement wherein said thread-supply means comprises two concentric rings rotatable coaxially in relation to each other, each

ring having at least one thread-supply location, and spacers operatively interconnecting said rings for controlled coaxial relative rotation of one ring in relation to the other, said rotation being superposed to the relative rotational movement of the thread-supply means and the envelop surface of the mandrel for cross-wound reinforcement of the tube at a desired cross-winding angle.

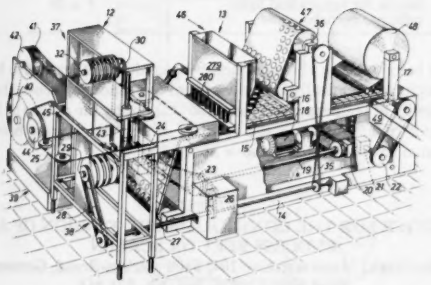


4,077,829

MACHINE FOR THE MANUFACTURE OF PACKING CONTAINERS

Herwig Pupp, and Birger Otto Andersson, both of Lund, Sweden, assignors to AB Ziristor, Lund, Sweden

Filed Sep. 3, 1976, Ser. No. 720,516
Claims priority, application Sweden, Sep. 10, 1975, 7510092
Int. Cl.[2] B29D *23/00*
U.S. Cl. 156—446 **11 Claims**



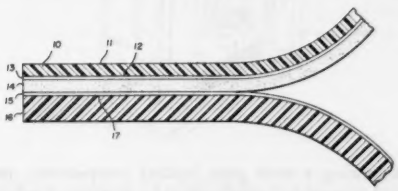
1. A machine for the manufacture of cup-shaped packing containers of a heat-shrinkable thermoplastic web material comprising, a mandrel rotatable about its axis and having an upper cylindrical portion and a lower frusto-conical portion, means for intermittently rotating said mandrel, means for intermittently feeding a continuous web of the material to the upper cylindrical portion of said mandrel, means for clamping the leading edge of said web to the outer circumference of said mandrel, means for cutting said web into blanks when the leading edge of the web is clamped to the mandrel so that when said mandrel is rotated a blank is wrapped about the cylindrical portion thereof to form a sleeve-shaped shell having overlapping opposed edges, means for heat sealing the overlapping opposed edges of the blank together, means for releasing said clamping means when the shell has been formed, means for displacing the shell downwardly of said mandrel so that the lower edge portion of the shell extends below the frusto-conical portion of said mandrel, means for introducing a base blank into the lower open end of the shell against the bottom of the mandrel, means for heating the lower end of the shell and base blank to cause the end of the shell to shrink inwardly of the shell to form an inwardly extending flange embracing the circumference of the base blank and for sealing the flange and base blank together to provide an impervious bottom for the packing container, means for removing the container from said mandrel and means for filling and sealing the containers.

4,077,830

LAMINATE AND METHOD FOR PROTECTING PHOTOGRAPHIC ELEMENT

Stanley S. Fulwiler, Hilton, N.Y., assignor to Tapecon, Inc., Rochester, N.Y.

Continuation of Ser. No. 504,093, Sept. 9, 1974, abandoned, which is a division of Ser. No. 307,093, Nov. 16, 1972, abandoned, which is a continuation of Ser. No. 88,755, Nov. 12, 1970, abandoned, and a continuation of Ser. No. 504,137, Sept. 9, 1974, abandoned, which is a continuation of Ser. No. 307,093, Nov. 16, 1972, abandoned, which is a continuation of Ser. No. 88,755, Nov. 12, 1970, abandoned. This application Jan. 27, 1976, Ser. No. 652,881
Int. Cl.[2] B32B *31/00*
U.S. Cl. 156—249 **4 Claims**



1. A protective, optically clear laminate formed of a thin, protective sheet of transparent resin material having a thin coating of transparent, pressure-sensitive adhesive covered by a release sheet, said laminate being wound in a roll before use and said laminate being used by removing said release sheet and pressing said adhesive against the emulsion surface of a photographic element having a developed image to preserve the optical properties of said image of said photographic element during a period when said photographic element is in use for contact printing, said laminate being characterized by:

a. both surfaces of said protective sheet having a surface finish of less than 10-millionths of an inch RMS;
b. said release sheet being formed of resin material with both surfaces having a surface finish of less than 10-millionths of an inch RMS;
c. the surface of said adhesive coating that is exposed when said release sheet is stripped away having a surface finish conforming to said release sheet and being less than 10-millionths of an inch RMS;
d. said exposed surface of said adhesive having said surface finish of less than 10-millionths of an inch RMS being in contact with said emulsion surface of said photographic element when said laminate is in use; and
e. the total thickness of said protective sheet and said adhesive being less than 0.002 inches.

4,077,831

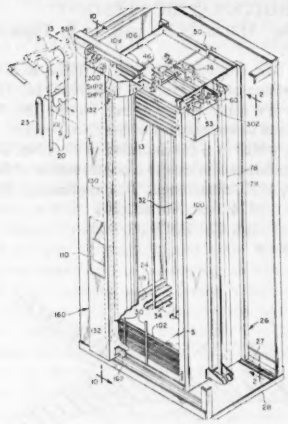
SHEET BINDING APPARATUS

Donald L. Snellman, 2807 W. Galer, Seattle, Wash. 98199; John C. Kuspert, 8844 36th SW., Seattle, Wash. 98126, and Arthur G. Saunders, 19827 Maple Valley Hwy., Maple Valley, Wash. 98038

Division of Ser. No. 387,541, Aug. 10, 1973, Pat. No. 4,009,071. This application Oct. 22, 1976, Ser. No. 735,050
The portion of the term of this patent subsequent to Feb. 22, 1994, has been disclaimed.
Int. Cl.[2] B32B *31/00*; B65C *11/04*
U.S. Cl. 156—563 **3 Claims**

1. Sheet binder apparatus, comprising: sheet assembling means for assembling sheets into a stack; adhesive binding means operatively associated with said sheet assembling means for applying adhesive to bind the stacked sheets simultaneously

by effecting adhesive bonds between corresponding edge portions thereof; and hold down means operatively associated with said binding means and said sheet assembling means for holding the sheets stationary to maintain edge alignment thereof during binding; said sheet assembling means including



means forming a sheet stack holding compartment, means mounted adjacent said compartment for distributing individual sheets into said compartment in order to form a sheet stack therein, and jogging means mounted adjacent the sheet stack for aligning the edges of stacked sheets in said compartment.

4,077,832

EPITAXIAL GROWTH OF BISMUTH RARE EARTH IRON GARNET FROM A FLUX OF BISMUTH OXIDE AND ALKALI METAL OXIDE

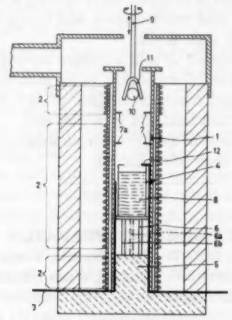
John M. Robertson, Eindhoven, Netherlands; John C. Brice, Copthorne Bank, England, and John E. Davies, San Francisco, Calif., assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1976, Ser. No. 729,901

Claims priority, application United Kingdom, Oct. 7, 1975, 40990/75

Int. Cl.² B01J *17/04, 17/06;* **C01G** *29/00*

U.S. Cl. 156—624 **6 Claims**



1. In the method of growing a monocrystalline bismuth rare earth iron garnet layer of the formula $Bi_p A_{3-p} D_q Fe_{5q} O_{12}$ wherein $0 < p < 3$, $0 < q < 5$, A is at least one rare earth selected from those elements having atomic numbers 21, 39 and 57 to 91 inclusive and D is at least one element selected from the group consisting of gallium and aluminum by liquid phase epitaxy from a melt on a crystal face of a monocrystalline substrate, the resulting layer having the crystallographic orientation of said crystal face, said melt comprising the components of said garnet and a flux, the improvement wherein the flux is present in a concentration of 60 to 90 mol % of the melt and comprises a mixture of Bi_2O_3 and Me_2O_3 wherein Me is at least one element selected from the group consisting of Li, Na, K, Rb and Cs, Me_2O is present in an amount of from 1% to 6% by weight of the melt and the molar ratio of $Bi_2O_3 : Me_2O_3$ in said flux is 100:x where the value of x is such that the mixture has a viscosity of less than 16 centipoises at the growth temperature and said flux is capable of forming a eutectic composition having a eutectic temperature below the melting point of pure Bi_2O_3.

4,077,833

FIRE RESISTANT, BAUXITE-CONTAINING, WOOD COMPOSITION BOARD

James R. Roberts, Palatine, Ill., assignor to Eucatex S.A. Industria E Comercio, Sao Paulo, Brazil

Continuation-in-part of Ser. No. 597,451, Jul. 21, 1975, Pat. No. 4,043,862, and Ser. No. 597,450, Jul. 21, 1975. This application Nov. 10, 1975, Ser. No. 630,615

Int. Cl.² D21H *3/22, 3/28, 3/66*

U.S. Cl. 162—176 **15 Claims**

1. Fire resistant, bauxite-containing composition board comprising a felted dried sheet comprising in dispersed admixture:

	% by weight, air dried sheet basis
Lignocellulose particles	10 to 85
Bauxite particles	65 to 20
Binder for bauxite and lignocellulose particles	5 to 25

the bauxite being characterized by containing at least 20% by weight of chemically bound water of hydration, by substantial stability at temperatures below 200° C.; but by the release of its water of hydration in the form of water vapor upon being heated to temperatures above about 200° C.

4,077,834

DEVICE FOR THE CONTROL OF THE TENSION OF AN ENDLESS BELT OR SCREEN

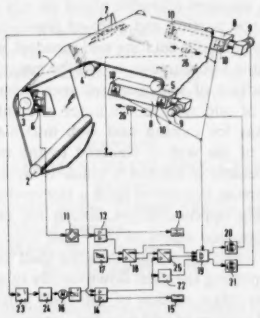
Theo Stark, Munsterstrasse 104, 5100 Aachen-Brand, Germany

Filed Sep. 7, 1976, Ser. No. 721,161

Claims priority, application Germany, Sep. 13, 1975, 2540923

Int. Cl.² D21F *7/00*

U.S. Cl. 162—257 **2 Claims**



1. Apparatus for controlling both the tension and edge run position of an endless belt or screen in a paper handling machine, comprising a unitary deflecting roller, first and second bearing means at the opposite ends of said roller, said bearing means rotatably supporting said roller, each said bearing means

being movably mounted in a slide member, first and second motor means operatively associated with said first and second bearing means, respectively, for individually displacing its associated bearing relative to a said slide, first electronic monitoring control means operatively connected to said first and second motors and responsive to the tension in said belt or screen for activating said motors to shift said bearings in said slides and thereby achieve a desired tension in said belt or screen, and second electronic monitoring control means responsive to the positions of the edges of said belt or screen for activating said motors to shift said bearings in said slides to achieve a desired edge position of said belt or screen, whereby both the position and tension of said belt or screen are controlled by said deflecting roller.

4,077,835

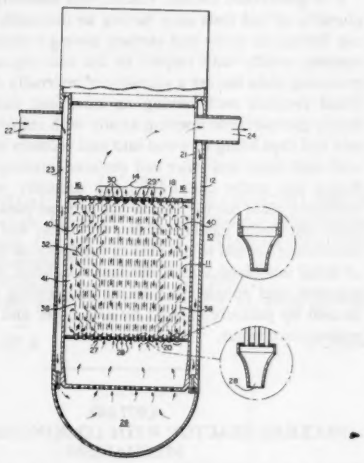
NUCLEAR REACTOR WITH SELF-ORIFICING RADIAL BLANKET

Alfred A. Bishop, Pittsburgh; Ernst H. G. Weiss, Murrysville, and Fred C. Engel, Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 310,070, Nov. 24, 1972, abandoned, which is a continuation of Ser. No. 53,966, Jul. 10, 1970. This application Apr. 29, 1975, Ser. No. 572,692

Int. Cl.² G21C *15/04*

U.S. Cl. 176—18 **3 Claims**



1. A nuclear reactor comprising:

a closed pressure vessel having a coolant flow inlet and outlet;

a core barrel supporting a reactor core in said vessel;

means spacing the core barrel from the pressure vessel to provide an annulus for the flow of coolant from the inlet to the bottom of said core;

said core comprising upper and lower core plates supporting a plurality of nuclear fuel assemblies therebetween;

a first portion of said assemblies containing primary fissile fuel located in a power producing central region of said core;

a second portion of said assemblies containing primary fertile fuel positioned in a breeder blanket region surrounding said first assemblies;

coolant flow openings in the lower and upper core plates co-extensive only with the central region of said core which together with said central region fuel assemblies permit coolant to flow into the core then axially upward through said central region of the core prior to discharge out said outlet;

means enclosing each of said blanket region fuel assemblies in a can which imparts structural support thereto, and perforations in each can which allow coolant from the central region to flow therethrough to cool the blanket fuel assemblies;

said central region assemblies being constructed and arranged to permit axial flow through the central region assemblies and radial flow outwardly thereof, and then upwardly thereof through the blanket assemblies, such construction imparting resistance to coolant flow through the central region assemblies, such resistance causing a radial pressure gradient near the bottom of said blanket assemblies and a reverse radial pressure gradient near the top of said blanket assemblies which acts to cause a portion of said axial flowing coolant to be directed radially outward into the bottom of said blanket assemblies prior to flow upwardly therethrough for cooling the same before returning near the top of said blanket assemblies to join said coolant flowing axially through said central region of the core.

4,077,836

APPARATUS FOR AUTOMATICALLY STARTING UP NUCLEAR REACTOR

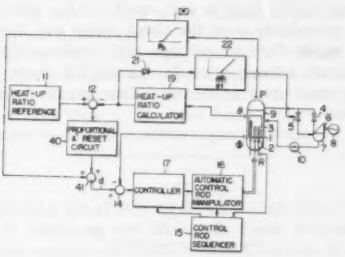
Takashi Omori, Kita-Ibaraki, and Sakae Sugiyama, Hitachi, both of Japan, assignors to Hitachi, Ltd., Japan

Filed Sep. 15, 1975, Ser. No. 613,430

Claims priority, application Japan, Sep. 20, 1974, 49-107742

Int. Cl.² G21C *7/06, 7/00*

U.S. Cl. 176—22 **10 Claims**



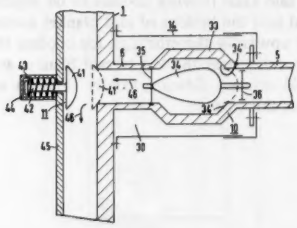
1. An apparatus for automatically starting up a nuclear reactor during a heat-up and pressurization phase of start-up, comprising a plurality of control rods disposed in a reactor core, a control rod driving means for inserting and withdrawing said control rods into and out of said reactor core, temperature detecting means for detecting reactor temperature, heat-up ratio calculator means for calculating a rate of change in the output of said temperature detector means, heat-up ratio reference means for providing a predetermined heat-up ratio value of said reactor temperature, said control rod driving means manipulating said control rods in accordance with the deviation of the output of said heat-up ratio calculator means from the output of said heat-up ratio reference means so as to maintain the heat-up ratio of said reactor temperature at the predetermined value, and heat-up ratio compensation means for correcting said heat-up ratio of said reactor temperature in accordance with at least one condition in said reactor for maintaining said heat-up ratio at the predetermined value during the heat-up and pressurization phase of start-up of said nuclear reactor.

4,077,837

PRESSURIZED-WATER REACTOR COOLANT PIPE CONTAINMENT

Hans-Peter Schabert, Erlangen; Leonhard Irion, Ruckersdorf, and Wolfgang Braun, Buckenhof near Erlangen, all of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Apr. 9, 1975, Ser. No. 566,341
Claims priority, application Germany, Apr. 9, 1974, 2417397
Int. Cl.[2] G21C *9/00*
U.S. Cl. 176—38 7 Claims



1. A pressurized-water reactor comprising a pressure vessel having at least one coolant nozzle and main coolant pipe connected to said nozzle and means for causing a normal circulation of coolant through said pipe and nozzle, said vessel and said pipe containing pressurized-water coolant, said pipe having a check valve through which the pipe is connected to said nozzle, said check valve being adapted to close in the event said normal circulation reverses due to a break in said pipe on the side of said pipe extending from said check valve away from said pressure vessel, and a pressure-resistant containment completely enclosing a space extending from said pressure vessel and surrounding said check valve, said containment being a tubular containment, said tubular containment having an inner end rigidly fixed to said vessel and the containment extending completely over the check valve and having an outer end rigidly fixed to said pipe, said tubular containment having mutually telescoped tubular sections which are slidable relative to each other in the axial direction of the tubular containment.

4,077,838

PYROLYTIC CARBON-COATED NUCLEAR FUEL

Terrence B. Lindemer; Ernest L. Long, Jr., both of Oak Ridge, Tenn., and Ronald L. Beatty, Wurlingen, Switzerland, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Jul. 28, 1976, Ser. No. 709,350
Int. Cl.[2] G21B *3/02*
U.S. Cl. 176—68 14 Claims

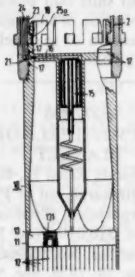
1. In a spheroidal nuclear fuel paticle comprising a kernel of a fissile metal carbide and at least one pyrolytic carbon coating and a silicon carbide coating on or adjacent said kernel, the improvement comprising a metal oxide within said kernel at a concentration effective to maintain fission product lanthanides as oxides up to at least 75% FIMA, at a temperature of an operating nuclear reactor containing said particle.

4,077,839

FUEL ASSEMBLY FOR GAS-COOLED NUCLEAR REACTORS

Martin Peehs, Bubenreuth, and Manfred Hünner, Erlangen, both of Germany, assignors to Kraftwerk Union Aktiengesellschaft, Mulheim (Ruhr), Germany

Filed Sep. 12, 1974, Ser. No. 505,259
Claims priority, application Germany, Sep. 28, 1973, 2348947
Int. Cl.[2] G21C *3/16*
U.S. Cl. 176—78 1 Claim



1. A gas-cooled nuclear reactor fuel assembly comprising a plurality of fuel rods each having an externally threaded end cap having an outer end surface having a fission outlet hole opening axially with respect to the end cap, and a fuel rod mounting plate having a plurality of internally threaded cylindrical recesses each having an inner end surface having a fission gas inlet hole opening axially with respect to the recess, said end caps being screwed into said recesses in each instance with said outer and inner end surfaces interengaging and said fission gas outlet and inlet holes mutually registered, said mounting plate having fission gas exhaust passages extending from said fission gas inlet holes, said outer and inner end surfaces being normal to the axes of the fuel rods and being made of metal machined with a residual roughness of from 4 to 16 microns, said roughness forming projections which are deformed by pressure exerted by said outer and inner surfaces against each other.

4,077,840

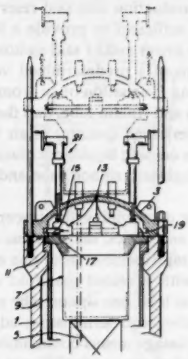
NUCLEAR REACTOR WITH LOCKING-KEY SAFETY MECHANISM

Roger Aubert, Orsay, France, assignor to Commissariat a l'Energie Atomique, Paris, France

Filed Oct. 20, 1976, Ser. No. 734,168
Claims priority, application France, Oct. 28, 1975, 75 32940
Int. Cl.[2] G21C *11/00*
U.S. Cl. 176—87 7 Claims

1. A nuclear reactor comprising a pressure vessel having a cap, means for securing said cap on said pressure vessel, core means including fuel assemblies and control elements disposed within said vessel, a supporting structure supported by said vessel above said core means for supporting said elements in the reactor and coupling means for coupling said cap with said supporting structure, said coupling means comprising a plurality of housing means mounted on said supporting structure above the line of engagement between said cap and said vessel, a plurality of recesses formed in said closure cap opposite each housing means, a locking key slidably disposed in each housing means for movement between a first position in engagement with said recesses and said housing means and a second position out of engagement with said recesses and actuating means for each locking key operable from the exterior of said reactor, said actuating means for each locking key comprising a rotatable shaft extending outwardly through said cap in pressure

tight relation and gear means coupling each shaft with each locking key so that upon rotation of said shafts in opposite



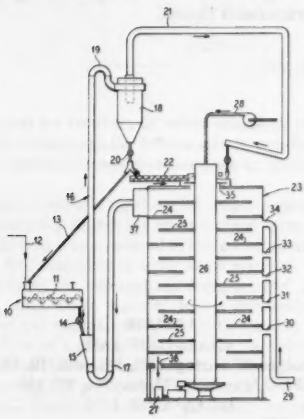
directions said locking keys will be moved into and out of engagement with said recesses.

4,077,841

METHOD AND APPARATUS FOR TREATING SLURRIES

Vladimir Suprunov; Alfred Kryczun, and Theodor Manshausen, all of Cologne, Germany, assignors to Klockner-Humboldt-Deutz Aktiengesellschaft, Germany

Filed Jul. 6, 1976, Ser. No. 703,017
Claims priority, application Germany, Jul. 11, 1975, 2530962
Int. Cl.[2] B01D *1/00*
U.S. Cl. 159—47 R **6 Claims**



1. A method for the thermal treatment of a slurry which comprises, passing said slurry into contact with a heated gas stream in a dryer to suspend and dry the particles of said slurry, passing the thus dried slurry particles while so suspended to a multi-tiered heated kiln, introducing heated gases into said kiln for contact with the dried slurry, and passing the exhaust gases from said kiln to said dryer to serve as said heated gas stream.

4,077,842

STABILIZED GLUCOSE ISOMERASE ENZYME CONCENTRATE

Robert Paul Cory, deceased, late of La Grange, Ill., and by Cynthia S. Cory, executor, R.R. No. 6 P.O. Box 67, Danville, Ind. 46122

Filed Mar. 19, 1976, Ser. No. 668,380
Int. Cl.[2] C07G *7/02, 7/028*
U.S. Cl. 195—63 **27 Claims**

1. A process for preparing a stabilized glucose isomerase enzyme concentrate, comprising:

a. treating an aqueous slurry of microbial cells containing intracellular glucose isomerase to release the isomerase from the cells and to thereby obtain a soluble cell-free glucose isomerase enzyme and insoluble materials in the resulting aqueous slurry;

b. treating the resulting aqueous slurry with a water miscible organic solvent selected from the group consisting of methanol, ethanol, propanol, 2-propanol, t-butanol, acetone and p-dioxane in an amount from about 30% to about 60% on a weight percent basis to precipitate a substantial portion of the non-isomerase proteinaceous materials and nucleic acids from said aqueous slurry upon release of the isomerase from the cells, but insufficient to precipitate the isomerase enzyme; said water miscible organic solvent being characterized as capable of decreasing the solubility of non-isomerase proteins and nucleic acids in aqueous media;

c. removing the insoluble materials including cellular debris and nucleic acids from said aqueous slurry to provide an aqueous mixture containing cell-free glucose isomerase enzyme and water miscible organic solvent;

d. treating said aqueous mixture containing a cell-free glucose isomerase enzyme and the water miscible organic solvent with a substantially water soluble magnesium salt selected from the group consisting of magnesium acetate, magnesium chloride and magnesium sulfate in an amount sufficient to provide said mixture from about 0.02 molar to about 0.3 molar with respect to the magnesium salt based on the total volume of the mixture to precipitate and to provide a stabilized enzyme concentrate comprising an enzyme magnesium precipitate in the mixture; and

e. recovering the stabilized enzyme concentrate comprising glucose isomerase enzyme, magnesium in an amount ranging from about 0.1 to about 2 molar measured as Mg^{++}, water and water miscible organic solvent.

4,077,843

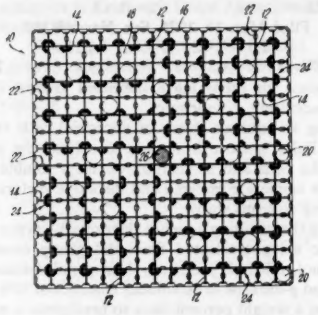
NUCLEAR REACTOR SPRING STRIP GRID SPACER

John F. Patterson, and Barney S. Flora, both of Richland, Wash., assignors to Exxon Nuclear Company, Inc., Bellevue, Wash.

Filed May 21, 1976, Ser. No. 688,924
Int. Cl.[2] G21C *3/30*
U.S. Cl. 176—76 **10 Claims**

1. A grid spacer for use in a nuclear fuel element assembly for maintaining the fuel rods in relatively spaced and substantially parallel relation, comprising a plurality of intersecting support strips and a peripheral support band secured to the ends of said support strips, a first plurality of said support strips defining an upper grid and a second plurality of said support strips defining a lower grid spaced from said upper grid wherein the intersecting strips form a plurality of openings for receiving fuel rods therein, each of said fuel rod receiving openings having a plurality of dimples protruding from said support strips into said openings and a plurality of spring means extending in different directions between the sides of said grid spacer and coacting with said dimples to maintain said fuel rods in position in said openings, each of said spring means comprising a longitudinally extended spring strip having an upper bridging member and a lower bridging member and spring members transversely disposed said members connected between said upper and lower bridging members, at spaced

locations along the length of said strip, said spring members at adjacent locations extending in alternating opposite transverse directions with respect to said bridging members and having corresponding transversely extending capture portions at each



of the locations of said spring members, and means associated with said grids for internally engaging said capture portions for positioning said spring means between said upper and lower grids of said grid spacer.

4,077,844

PROCESS FOR PREPARING STEFFIMYCINOL

Vincent P. Marshall, Portage; David W. Elrod, Kalamazoo; James M. Koert, Kalamazoo; Elizabeth A. Reisender, Kalamazoo, and Paul F. Wiley, Kalamazoo, all of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 30, 1977, Ser. No. 782,621
Int. Cl.² C12D *9/18*
U.S. Cl. 195—80 R **3 Claims**

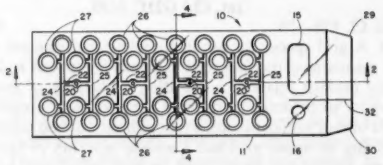
1. A process for preparing the antibiotic steffimycinol which comprises cultivating *Streptomyces peucetius* var. caesius, having the identifying characteristics of ATCC 27952, in an aqueous nutrient medium under aerobic conditions in the presence of the antibiotic steffimycinone until substantial conversion of steffimycinone to steffimycinol, and recovering steffimycinol.

4,077,845

DISPOSABLE INOCULATION DEVICE AND PROCESS OF USING SAME

Leighton Clifford Johnson, Edwardsburg, Mich., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Filed Apr. 20, 1977, Ser. No. 789,203
Int. Cl.² C12B *1/02*; C12K *1/00*
U.S. Cl. 195—103.5 K **16 Claims**



1. Inoculation apparatus comprising a plate formed with at least one sealed growth well, said plate being formed with a sealed reservoir, at least one siphon tube projecting into said reservoir and terminating adjacent the bottom thereof, flow passage means communicating between said siphon tube and an upper portion of said growth well, said plate being provided with aperture means communicating with said reservoir and having a first portion through which liquid inoculum can be introduced into said reservoir, said aperture means also having a second portion adapted for connection with pump means, and removable closure means for sealingly closing each of said first and second portions of said aperture means following connection of said second aperture means portion with pump means and after introduction into said reservoir of an amount of liquid inoculum sufficient to provide a liquid level in said reservoir above the lower end of said siphon tube, withdrawal by said pump means of a predetermined volume of air from said reservoir causing evacuation of air from said growth well, flow passage means and siphon tube, and the subsequent introduction of a predetermined quantity of air into said reservoir by said pump means causing liquid inoculum to be forced from said reservoir through said siphon tube and passage means to said growth well.

14. A process for determining the susceptibility of specific microorganisms to antibiotics, said process comprising:

removing a first tape member from one end of a microtiter tray formed with a sealed manifold chamber, separate growth wells, at least one siphon tube projecting into said manifold chamber and terminating adjacent the bottom thereof, flow passage means communicating between said siphon tube and upper portion of said growth wells, and aperture means communicating with said manifold chamber, said aperture means having a first filling portion covered by said first tape member and a second portion covered by a second tape member, said second portion adapted for connection with pump means; introducing a clinical specimen containing microorganisms into said central manifold chamber of said tray;

resealing the first tape member and removing a second tape member from said microtiter tray;

evacuating air from said growth wells in which a selective culture medium is contained and from wells in which blends of the selective culture medium and known antibiotics are contained, said culture medium favoring the specific microorganism such that the light transmitting characteristics of a mixture of the culture medium and water will change when the favored microorganism is sustained within and nourished by the medium;

replacing the evacuated air with an aliquot mixture of said clinical specimen from said central manifold chamber and resealing said second tape member;

incubating the tray; and

observing the growth wells for change in the light transmitting characteristics thereof.

4,077,846

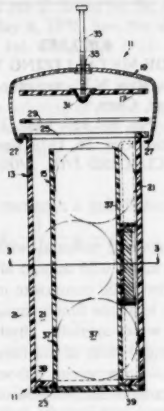
ANAEROBIC JAR

Robert D. Hedges, 95 Carrage Hill, Macomb, Ill. 61455

Filed May 16, 1977, Ser. No. 797,126
Int. Cl.² C12K *1/10*
U.S. Cl. 195—139 **5 Claims**

1. An anaerobic jar, comprising: a plurality of vertically elongated panels defining a vertically elongated chamber of generally polygonal horizontal cross-section, a major portion of the walls of said chamber being transparent; means comprising vertically and circumferentially disposed elements spaced inwardly from and parallel to said panels to define receptacles having roughly-culture-holder-thickness radial dimensions for

positioning a plurality of petri culture-holders in edge-wise superposed vertical array with culture media thereon exposed



for viewing through at least portions of said chamber walls; and means for hermetically sealing said chamber.

4,077,847

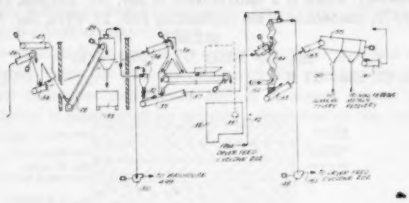
SOLID WASTE DISPOSAL SYSTEM

Charles K. Choi, Claremont; Booker W. Morey, Pasadena; Robert W. Frischmuth, Huntington Beach; Joseph P. Tassoney, Diamond Bar, and Richard M. Gundzik, Placentia, all of Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Continuation-in-part of Ser. No. 603,865, Aug. 11, 1975, abandoned. This application Aug. 31, 1976, Ser. No. 719,261

Int. Cl.[2] B03B *7/00, 9/00;* **C10B** *49/16, 53/02*

U.S. Cl. 201—21 **21 Claims**



1. A process for recovery of values contained in solid waste materials including organic, ferrous metals, non-ferrous metals and glass constituents which comprises, in combination, the steps of:

(a) initially comminuting the solid waste material;

(b) magnetically separating ferrous metal from the initially comminuted waste material to leave a substantially ferrous metal free comminuted solid waste material;

(c) classifying the substantially ferrous metal free comminuted solid waste material into a substantially organic fraction and a substantially inorganic fraction by an elutriating flow of a gas upward through the substantially ferrous metal free comminuted solid waste material;

(d) separating, by particle size differential, the substantially inorganic fraction into a first glass-rich inorganic fraction and a non-ferrous metals fraction;

(e) further comminuting the first glass-rich inorganic fraction and isolating from the comminuted first glass-rich inorganic fraction, particles in the size range from about 20 to about 325 mesh;

(f) subjecting the particles from glass-rich fraction having a particle size from about 20 to about 325 mesh to froth flotation in the presence of a beneficiating amount of a flotation reagent for glass to form a float comprising predominately glass and an inorganic tailing;

(g) recovering the glass from the float;

(h) drying the substantially organic fraction formed in step (c) and forming a dried substantially organic fraction of a particle size less than about 5 mesh;

(i) subjecting the formed, dried substantially organic fraction to flash pyrolysis by:

(i) combining the formed, dried substantially organic fraction, a particulate heat source and a carrier gas which is non-deleteriously reactive with respect to pyrolysis products under turbulent flow conditions in a flash pyrolysis zone maintained at a temperature from about 600 to about 2000° F by the flow of the particulate heat source therethrough to form a pyrolysis product stream including carbon containing solid residue of pyrolysis, the particulate source of heat, gases and condensible pyrolytic oils;

(ii) separating a mixture of the carbon containing solid residue of pyrolysis and the particulate source of heat to form a resultant remaining pyrolysis product stream;

(iii) subjecting at least a portion of the mixtue of the carbon containing solid residue of pyrolysis and particulate source of heat to at least partial oxidation in the presence of a source of oxygen to form the particulate source of heat for feed to the pyrolysis zone.

4,077,848

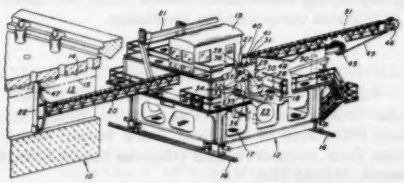
METHOD AND APPARATUS FOR APPLYING PATCHING OR SEALING COMPOSITIONS TO COKE OVEN SIDE WALLS AND ROOF

Larry G. Gainer, Elizabeth Township, Allegheny County, and Thomas G. Wylie, Whitehall Borough, Allegheny County, both of Pa., assignors to United States Steel Corporation, Pittsburgh, Pa.

Filed Dec. 10, 1976, Ser. No. 749,596

Int. Cl.[2] C10B *29/02;* **F27D** *1/16*

U.S. Cl. 201—41 **8 Claims**



1. In a coking operation in which coke is produced in an oven having refractory side walls and roof, and completed coke is pushed from the oven with a pusher ram and ram head of a pusher machine, a method of patching or sealing cracks in the refractory, said method comprising subsequent to pushing of completed coke from the oven applying to the refractory a patching or sealing composition from nozzles located on the head of the pusher ram while the ram moves through the empty oven.

4,077,849

DESALINATION APPARATUS

Kurt F. Ziehm, Jr., P.O. Box 13, Land O'Lakes, Wis. 54540

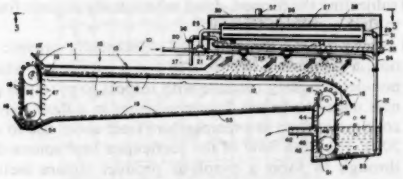
Filed Nov. 3, 1975, Ser. No. 627,964

Int. Cl.[2] B01D *1/16, 3/10*

U.S. Cl. 202—205 **8 Claims**

1. Solar desalination apparatus comprising a heating chamber having a light-permeable, glass cover in its upper side, a plurality of small, solar-heatable, metal balls, parallel tracks extending longitudinally through said chamber beneath said cover to convey said balls through said chamber, said glass cover being composed of rows of lenses, said rows being directly above and aligned with said tracks, said lenses focusing

solar rays at approximately the uppermost level of said balls as they roll along said tracks through said chamber to subject said balls to solar radiation and thereby heat said balls, a vaporizing chamber adjacent said heating chamber, means to convey the



heated balls through said vaporizing chamber, means for applying saline water onto said heated balls in said vaporizing chamber to vaporize the water applied thereon, and condensing means to condense the essentially salt-free water vapors so produced.

4,077,850

METHOD FOR THE PURIFICATION OF MONOCHLOROBENZENE

Stephen Robota, North Tonawanda, and James A. Whelan, Niagara Falls, both of N.Y., assignors to Hooker Chemicals & Plastics Corporation, Niagara Falls, N.Y.

Filed Aug. 30, 1976, Ser. No. 719,001
Int. Cl.² B01D *3/34;* C07C *25/06*
U.S. Cl. 203—29 **6 Claims**

1. A method of purifying monochlorobenzene contaminated with partly chlorinated unsaturated lower aliphatic compounds comprising

(A) selectively photochlorinating the chlorinated unsaturated aliphatic compounds to produce more fully chlorinated saturated aliphatic compounds, and

(B) separating monochlorobenzene from the more fully chlorinated compounds by distillation.

4,077,851

PATTERNED CHROMATE FILM PROCESS

Douglas Leon Simms, East Orange; Peter Kenny Skurkiss, Short Hills, both of N.J., and Clark Woody Wnite, Oak Ridge, Tenn., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 4, 1977, Ser. No. 774,482
Int. Cl.² C25D *5/02;* C23C *15/00*
U.S. Cl. 204—15 **10 Claims**

1. A process for producing patterned chromate film on metallic substrates in which part of the metallic surface is covered with chromate film comprising the step of

(a) removing chromate film from designated areas of the chromated metallic substrate by sputtering so as to form a patterned chromate film on a metallic substrate.

4,077,852

SELECTIVE GOLD PLATING

Donald Eldridge Koontz, Summit, and Peter Kenny Skurkiss, Short Hills, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 9, 1977, Ser. No. 766,897
Int. Cl.² C25D *5/02*
U.S. Cl. 204—15 **9 Claims**

1. A process for selectively electroplating gold on metallic surfaces containing at least 20 weight percent copper in which part of the metallic surface is covered with a chromate film comprising the step of:

(a) exposing the patterned metallic surface to a gold electroplating procedure so that the chromate film acts as a mask to gold electroplating and gold is electroplated on the unchromated part of the metallic surface.

4,077,853

METHOD OF METALLIZING MATERIALS

Miguel Coll-Palagos, Rye, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 561,957, Mar. 25, 1975, abandoned. This application Oct. 26, 1976, Ser. No. 735,242
Int. Cl.² C25D *1/08, 5/00, 5/54*
U.S. Cl. 204—20 **7 Claims**

1. A method of metallizing a substrate material comprising the steps of:

a. coating said substrate material with a coating having a thickness from about 0.05 mils to about 5 mils of a non-conductive hydrophilic composite material comprised of a blend of (1) at least one film forming component, and (2) at least one water-insoluble hydrophilic component wherein the weight ratio of the film forming component to the hydrophilic component is from about 3:10 to about 10:1 and said components can be dissolved in a solvent without phase separation;

b. plating said hydrophilic composite material with a conductive metal by electroless metal plating;

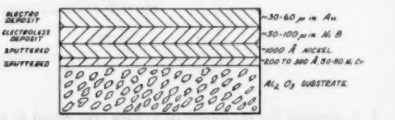
c. electroplating a metal onto the electrolessly plated metal.

4,077,854

METHOD OF MANUFACTURE OF SOLDERABLE THIN FILM MICROCIRCUIT WITH STABILIZED RESISTIVE FILMS

Gordon J. Estep, Agoura, and Bernard Lee Burton, Simi, both of Calif., assignors to The Bendix Corporation, North Hollywood, Calif.

Division of Ser. No. 574,651, May 2, 1975, Pat. No. 3,977,840, which is a division of Ser. No. 507,184, Sep. 9, 1974, Pat. No. 3,904,461, which is a continuation of Ser. No. 293,988, Oct. 2, 1972, abandoned. This application Feb. 27, 1976, Ser. No. 662,063
Int. Cl.² B05D *5/12, 3/02, 1/36*
U.S. Cl. 204—37 R **7 Claims**



1. A method of making a microcircuit board comprising:

forming a substrate of high-temperature insulating material to the desired dimensions,

depositing a layer of nickel-chromium on said substrate,

depositing a thin layer of nickel on said nickel-chromium layer,

depositing a nickel-boron film on said nickel layer, and heat-treating the boards so formed.

2. A method of making a microcircuit board as set forth in claim 1 wherein a layer of gold is electro-deposited on said nickel-boron film prior to heat-treating.

6. A method of metalizing an electrical component comprising the steps of:

1. depositing a layer of chromium on a surface of said component,

2. depositing a layer of nickel on said chromium layer, and

3. depositing a nickel-boron layer on said nickel layer.

7. A method of metalizing an electrical circuit component as set forth in claim 6 including depositing a layer of gold on said nickel-boron layer.

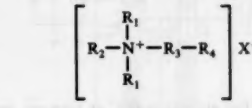
4,077,855

BRIGHT NICKEL ELECTROPLATING BATH AND PROCESS

Francine Popescu, 32 rue E. Dolet 94, St. Maur, France

Filed May 4, 1976, Ser. No. 683,061
Int. Cl.[2] C25D 3/16
U.S. Cl. 204—49 14 Claims

1. In a bath for electrodepositing bright nickel and comprising an acidic aqueous solution of nickel ions, the improvement which comprises, dissolved therein, an effective amount of a nickel brightener of formula:



wherein:

R_1 is selected from the group consisting of methyl, ethyl and hydroxyethyl;

R_2 is selected from the group consisting of alkenyl, alkynyl, hydroxy-substituted alkynyl and lower alkyl-substituted alkynyl;

R_3 is selected from the group consisting of lower alkylene, lower alkoxyalkylene, lower alkenylene, lower alkoxyalkenylene, hydroxy-substituted lower alkylene, carboxy-substituted lower alkylene, and hydroxy- and methyl-substituted lower amino-alkylene;

R_4 is selected from the group consisting of a sulfonic radical ($-SO_3^-$) and an aliphatic carboxy-ester group

where R_5 is alkyl, alkenyl, alkynyl, alkoxyalkynyl, dialkoxyalkynyl, hydroxyalkyl, hydroxyalkenyl, hydroxyalkynyl, haloalkyl, halohydroxyalkyl, halohydroxyalkynyl or hydroxyalkoxyalkynyl; and

X is selected from the group consisting of halogen and hydroxy when the positive charge on the nitrogen atom is not otherwise neutralized and X is absent when said charge is neutralized by another substituent of the molecule.

4,077,856

REMOVAL OF MERCURY FROM LIQUIDS

Wolfgang Habermann, Mainz; Dieter Stockburger, Gruenstadt; Peter Thoma, Frankenthal, and Gotthard Csizi, Bad Duerkheim, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Germany

Filed Apr. 9, 1976, Ser. No. 675,611
Claims priority, application Germany, Apr. 25, 1975, 2518433
Int. Cl.[2] C02C 5/12
U.S. Cl. 204—149 10 Claims

1. A process for the removal of mercury from a liquid containing mercury as an impurity in elemental or dissolved form, which process comprises treating said liquid by contact with a cathodically polarized nickel as one electrode in the presence of a counterelectrode consisting of platinum, graphite or magnetite and at a temperature of from 80° to 230° C, the potential of the nickel being adjusted by the application of an external voltage so as to have a value which differs from the potential of a said reversible hydrogen electrode in said liquid by not more than from −250 mV to +50 mV.

4,077,857

METHOD FOR THE PREPARATION OF PERFLUOROETHERS

Madeline S. Toy, Palo Alto, and Roger S. Stringham, Woodside, both of Calif., assignors to The Unites States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Feb. 23, 1977, Ser. No. 771,853
Int. Cl.[2] B01J 1/10
U.S. Cl. 204—158 R 8 Claims

1. A method for preparing perfluoropolymers which comprises the steps of (A) forming a reaction mixture of (1) a perfluoroalkyl dioxide and (2) a perfluorocycloolefin; (B) subjecting said mixture to photolysis for a period of time and at a temperature sufficient to effect a reaction therebetween; and (C) separating the resultant reaction products.

4,077,858

COMPLETELY POLYMERIZED ULTRAVIOLET CURED COATINGS

John R. Costanza, North Plainfield, and George L. Collins, Murray Hill, both of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,559
Int. Cl.[2] C08F 2/50, 4/00
U.S. Cl. 204—159.23 4 Claims

1. In an ultraviolet coating composition containing, based on the total weight of the system, about 30 to about 95 percent of an alpha beta ethylenically unsaturated vinyl polymerizable compound containing at least about 2 sites of vinyl polymerizable unsaturation, up to about 65 percent, by weight, on the same basis, of an alpha beta ethylenically unsaturated vinyl polymerizable compound containing a single site of alpha beta ethylenic unsaturation, and about 0.01 to about 15 percent, on the same basis, of an ultraviolet photoinitiator, the improvement of which comprises utilizing about 5 to about 50 percent, by weight, based on the total ultraviolet curable system, of an aliphatic saturated ether containing no other groups interferingly reactive with the ultraviolet cross-linking mechanism.

4,077,859

POLYUNSATURATED HALOGENATED MONOMERS FOR USE IN ULTRAVIOLET COATING SYSTEMS

John R. Costanza, North Plainfield; Anthony B. Conciatori, and Nelson R. Lazear, both of Chatham, all of N.J., assignors to Celanese Corporation, New York, N.Y.

Filed Oct. 4, 1976, Ser. No. 729,560
Int. Cl.[2] C08F 2/50, 4/00
U.S. Cl. 204—159.23 8 Claims

1. In an ultraviolet curable coating composition containing about 5 to about 85 percent, by weight, based upon the total composition, of an alpha beta ethylenically unsaturated vinyl polymerizable compound containing at least 2 sites of alpha beta ethylenic unsaturation, up to about 50 percent, on the same basis, of another alpha beta ethylenically unsaturated vinyl polymerizable monomer containing a single site of alpha beta ethylenic unsaturation, and about 0.05 to about 15 percent, by weight, of an ultraviolet photoinitiator, the improvement of which comprises utilizing as a reactive comonomer a polyacrylate or methacrylate ester of a polyhalogenated polyol.

4,077,860

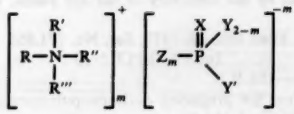
PHOTOPOLYMERIZABLE COMPOSITION STABILIZED WITH AMMONIUM SALTS OF PHOSPHORUS ACID AND PROCESS

Francis A. Via, Yorktown Heights, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Dec. 29, 1976, Ser. No. 755,286
Int. Cl.[2] C08F 2/50, 4/00
U.S. Cl. 204—159.24 52 Claims

1. A process for preparing a photopolymerizable composition comprising forming a mixture containing a photopolymer-

izable ethylenically unsaturated compound, a benzoin ether in an amount sufficient to initiate photopolymerization and a stabilizing amount of an ammonium salt of a phosphorus acid having the formula



wherein

R is hydrocarbyl or thiophenealkylene;

R′,R″ and R‴ are

a. independently selected hydrocarbyl; or

b. together are part of a heterocyclic amino radical in which the quaternary nitrogen in the formula is part of the ring;

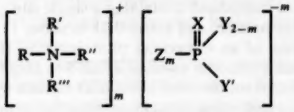
X is oxygen or sulfur;

Y and Y′ are independently selected alkoxy, thioalkoxy, alkenyloxy, thioalkenyloxy, alkyl, carboalkoxyalkyl, phenylalkyl, phenyl, thiophenoxy, aryloxy, alkaryloxy, aralkoxy, or alkylthiophenoxy;

Z is oxygen or sulfur; and

m is 1 or 2.

52. A photopolymerizable composition comprising at least one photopolymerizable ethylenically unsaturated compound containing a photoinitiating compound in an amount sufficient to initiate photopolymerization and a stabilizing amount of an ammonium salt of a phosphorus acid having the formula



wherein

R is hydrocarbyl or thiophenealkylene;

R′, R″ and R‴ are

a. independently selected hydrocarbyl; or

b. together are part of a heterocyclic amino radical in which the quaternary nitrogen in the formula is part of the ring;

X is oxygen or sulfur;

Y and Y′ are independently selected alkoxy, thioalkoxy, alkenyloxy, thioalkenyloxy, alkyl, alkylcarboxyalkyl, phenylalkyl, phenyl, thiophenoxy, aryloxy, alkaryloxy, aralkoxy, or alkylthiophenoxy;

Z is oxygen or sulfur; and

m is 1 or 2.

4,077,861

POLAROGRAPHIC SENSOR

Jay M. Lauer, Hacienda Heights, Calif., assignor to Teledyne Industries, Inc., San Gabriel, Calif.

Division of Ser. No. 653,017, Jan. 28, 1976, abandoned. This application Nov. 5, 1976, Ser. No. 739,253

Int. Cl.² G01N *27/46*

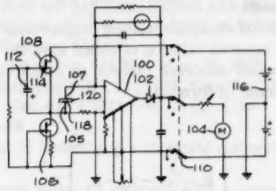
U.S. Cl. 204—195 P **10 Claims**

1. A polarographic, electrochemical cell instrument for determining the concentration of a selected gas in a mixture of gases;

a polarographic cell having a thin electrolyte film disposed between a first cathode electrode formed of a noble metal capable of polarographically reducing oxygen and a gas permeable membrane and having a second, non-polarizable metal, anode electrode in electrical connection with the electrolyte, the combination therewith:

biasing means for applying a low controlled voltage bias at first polarity between said first and second electrodes at a polarographic reducing potential of the selected gas and below the reducing potential of other gases in the mixture;

manual, one-way turn-on switching means connected to the biasing means through activation means; and



activation means for automatically, at turn-on, applying a voltage pulse of second polarity to the first electrode and including electronic timing and cut-off means for terminating said pulse after about ten seconds from turn-on.

4,077,862

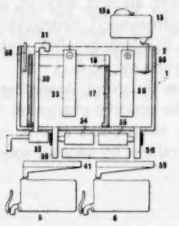
DEVICE FOR REGULATING DRINKING WATER

Tatsuo Okazaki, Kamifukuoka, Japan, assignor to Okazaki Manufacturing Company Limited, Kawagoe, Japan

Filed Jan. 23, 1976, Ser. No. 651,839

Int. Cl.² C02B *1/82*

U.S. Cl. 204—262 **15 Claims**



1. A device for softening and increasing the pH of drinking water comprising:

an electrolyzer vessel for receiving water therein;

an unglazed partition member dividing said vessel into a negative electrode chamber and a positive electrode chamber;

positive and negative electrodes disposed in the respective positive and negative electrode chambers and adapted to be energized by direct current for a prescribed period of time to separate water in the electrolyzer into two components having a hydroxyl radical in different densities by electrolysis and electroendosmose;

the negative electrode positioned in the negative electrode chamber having a hollow space therein;

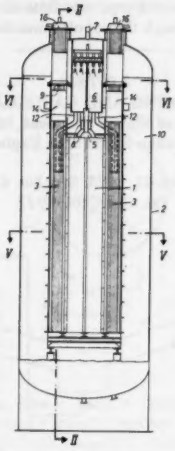
a heating element disposed in said hollow space of said negative electrode for warming up the water body in the electrolyzer at each time of the electrolysis to improve the softening of the water; and

a thermo-switch in said hollow space of said negative electrode, said thermo-switch being coupled to said heating element to cut off the voltage supply to said heating element at a predetermined temperature to avoid overheating of said negative electrode.

4,077,863
PRESSURE ELECTROLYZER

Gamal El Din Nasser, Puchheim, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Oct. 29, 1976, Ser. No. 737,200
Claims priority, application Germany, Oct. 30, 1975, 2548699
Int. Cl.[2] C25B *1/02, 9/00*
U.S. Cl. 204—268 6 Claims



1. In a pressure electrolyzer provided with bipolar electrodes forming a plurality of cell units arranged in the form of a cell block, the cell block and at least part of the devices for the cleaning, cooling and circulation of the electrolyte being disposed within a common pressure vessel, the improvement comprising said cell block having a square configuration, openings for the electrolyte being disposed on the underside of said cell block, said cells being arranged in a U-shaped turn, a mounting for the cell block and current leads attached exclusively to one end of said cell block and to one diameter of the side wall of the pressure vessel, said vessel having a cylindrical configuration, cooling means extending along the outside of said cell block, filter mat means being disposed in the flow path of the electrolyte upstream of the cooling means and means for conducting the electrolyte through said filter mat and cooling means and said openings for the electrolyte into the interior of the cell block.

4,077,864
ELECTROFORMING ANODE SHIELDS

Ramon D. Vanderveer, Mission Viejo, and William P. Dugan, Ontario, both of Calif., assignors to General Dynamics, Pomona, Calif.

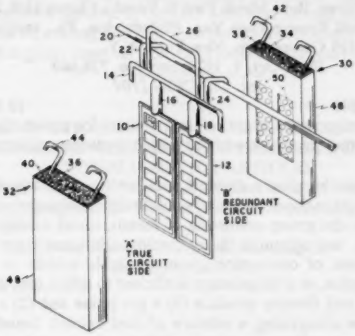
Division of Ser. No. 395,869, Sep. 10, 1973, abandoned. This application Dec. 20, 1974, Ser. No. 535,054
Int. Cl.[2] C25D *5/02, 7/10, 7/12*
U.S. Cl. 204—285 6 Claims

1. An electroforming system comprising:

a tank adapted to contain an electrolytic solution;

means for supporting a printed circuit board cathode immersed in said electrolytic solution tank;

anode means adapted to be immersed in said electrolytic solution tank in the vicinity of the supporting means and including a titanium wire anode basket for containing nickel chips, the material of which is to be electroformed on the cathode, and a non-conductive external shield disposed around the substantially enclosing the exterior of the anode basket, said external shield having a plurality of openings disposed in a predetermined pattern of shape and location on the side of said shield facing the cathode which is related to the configuration of the cathode; and

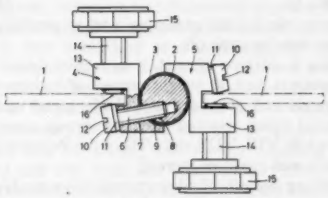


means for directing a current between anode and cathode through said solution to electro-deposit nickel from the nickel chips on the cathode.

4,077,865
CLAMPING DEVICE FOR ARTICLES TO BE ELECTROPLATED

Arthur E. Müller, Greifensee, Switzerland, assignor to Zbinden & Co., Derendingen, Switzerland

Filed Dec. 3, 1976, Ser. No. 747,427
Int. Cl.[2] C25D *17/06*
U.S. Cl. 204—297 W 4 Claims



1. In a device for clamping an article to be electroplated to a bus bar, of the type having at least one support secured to said bus bar and a clamping screw driven into said support to hold said article, the improvement comprising:

a continuous bore disposed in said support at an angle to the longitudinal axis of said clamping screw,

a threaded blind bore disposed in said bus bar substantially at right angles to the longitudinal axis of said bus bar,

a bearing surface formed in a portion of said support surrounding said continuous bore and adapted to bear upon a matching surface portion of said bus surrounding said blind bore, and

a contact screw having a continuous circumferential portion forming a contact surface and a shank adapted for insertion through said continuous bore and into said blind bore, said contact screw being of metal and comprising a head, said contact surface being a continuous circumferential surface portion of said head, said clamping screw including a shank having an end face, the generatrix of said circumferential surface portion nearest said end face running parallel to said end face, said bus bar being of circular cross-section, and said bearing surface being adapted to bear upon a said matching surface portion of said bus bar extending over at least one-quarter of the circumference of said bus bar.

4,077,866

PROCESS FOR PRODUCING LOW-SULFUR LIQUID AND SOLID FUELS FROM COAL

Hartley Owen, Belle Mead; Paul B. Venuto, Cherry Hill, both of N.J., and Tsoung-Yuan Yan, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Oct. 1, 1976, Ser. No. 728,660
Int. Cl.[2] C10G *1/04*
U.S. Cl. 208—9 10 Claims

1. An improved solvent refining process for converting coal to clean fuel products without added hydrogen which comprises:

a. contacting finely divided coal with a coal liquefaction solvent in the presence of a solid sulfur scavenger selected from the group consisting of metals, metal oxides, metal salts, and mixtures thereof, said sulfur scavenger being capable of conversion to an insoluble sulfide or sulfur complex, at a temperature sufficient to effect coal dissolution and thereby produce (1) a gas phase and (2) a liquid phase comprising a mixture of coal extract, liquefaction solvent, sulfur scavenger and undissolved residue;

b. effecting separation of said liquid phase mixture by clarifier settling means to produce (1) a clarified settler overflow containing coal extract and coal liquefaction solvent and (2) a solids-rich settler underflow; and

c. thereafter recovering from said overflow a fuel product of reduced sulfur content.

4,077,867

HYDROCONVERSION OF COAL IN A HYDROGEN DONOR SOLVENT WITH AN OIL-SOLUBLE CATALYST

Clyde L. Aldridge, and Roby Bearden, Jr., both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Jul. 2, 1976, Ser. No. 702,272
Int. Cl.[2] C10G *1/08*
U.S. Cl. 208—10 31 Claims

1. A process for hydroconverting coal to produce an oil, which comprises the steps of:

(a) forming a mixture of coal, a hydrogen donor solvent comprising at least 30 weight percent of hydrogen donor compounds and an added oil-soluble metal compound, said metal being selected from the group consisting of Groups VB, VIB, VIIB and VIII of the Periodic Table of Elements and mixtures thereof;

(b) converting said oil-soluble compound to a catalyst within said mixture in the presence of a hydrogen-containing gas by heating said mixture to an elevated temperature;

(c) reacting the resulting mixture containing said catalyst with hydrogen under coal hydroconversion conditions, in a hydroconversion zone;

(d) removing from said hydroconversion zone an effluent comprising an oil product and solids;

(e) separating said oil product into at least a light fraction, an intermediate fraction and a heavy fraction; and

(f) recycling, without intervening hydrogenation, at least a portion of said intermediate fraction as solvent to said hydroconversion zone.

4,077,868

METHOD FOR OBTAINING HYDROCARBON PRODUCTS FROM COAL AND OTHER CARBONACEOUS MATERIALS

R. William Chambers, Tustin, Calif., assignor to Deco Industries, Inc., Irvine, Calif.

Continuation-in-part of Ser. No. 548,498, Feb. 10, 1975, abandoned, which is a continuation-in-part of Ser. No. 472,788, May 23, 1974, abandoned, which is a continuation-in-part of Ser. No. 384,319, Jul. 31, 1973, abandoned. This application Nov. 22, 1976, Ser. No. 743,939
Int. Cl.[2] C10G *1/08, 1/02*
U.S. Cl. 208—10 22 Claims

1. The method of obtaining hydrocarbon products from solid carbonaceous feed material containing water and hydrocarbons, including the steps of:

continuously moving the feed material through an elongated tubular member maintained at an operating temperature between about 1000° F. and about 1800° F., in the substantial absence of oxygen; and

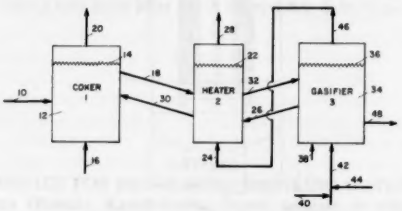
withdrawing gases and vapors from the tubular member under a vacuum within the tubular member in a manner to cause such gases and vapors to flow through said material as it moves through the tubular member.

4,077,869

INTEGRATED COKING AND GASIFICATION PROCESS

Karsten H. Moritz, and Walter Weissman, both of Baton Rouge, La., assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Oct. 21, 1975, Ser. No. 624,454
Int. Cl.[2] C10G *9/32*
U.S. Cl. 208—127 12 Claims



1. In an integrated coking and gasification process comprising the steps of

(a) reacting a heavy hydrocabonaceous oil containing sulfur contaminants, said heavy hydrocarbonaceous oil having a Conradson carbon content of at least 5 weight percent in a coking zone containing a bed of fluidized solids maintained at a temperature ranging from about 850° to about 1,250° F. and at a pressure ranging up to about 164.7 pounds per square inch absolute to form coke containing sulfur contaminants, said coke depositing on said fluidized solids;

(b) introducing a portion of said solids with the coke deposition thereon into a heating zone operated at a temperature greater than said coking zone temperature to heat said portion of solids;

(c) recycling a first portion of heated solids from said heating zone to said coking zone and introducing a second portion of said heated solids to a fluid bed gasification zone maintained at a pressure ranging up to about 164.7 psia and at a temperature ranging from about 1600° F. to about 2000° F. and wherein an oxygen-containing gas is introduced into said gasification zone, the improvement which comprises introducing a molecular hydrogen-containing gas into said gasification zone, the total hydrogen partial pressure in said gasification zone, as measured at the gasifier outlet, ranging from about 4 to about 38 psia.

4,077,870

METHOD FOR ELECTRICALLY CRACKING PETROLEUM CRUDE

Martin Horowitz, Berkeley, Calif., assignor to George B. Saviers, Jr., San Francisco, Calif.

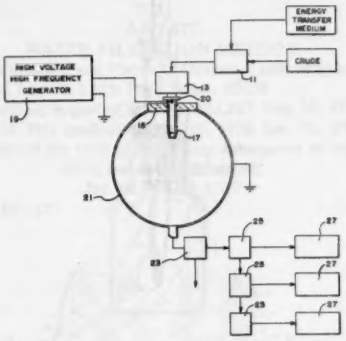
Division of Ser. No. 425,713, Dec. 18, 1973, Pat. No. 3,902,071. This application Aug. 15, 1975, Ser. No. 604,960
Int. Cl.[2] C07C *3/26;* B01K *1/00;* C07C *3/34*
U.S. Cl. 208—128 6 Claims

1. A method for cracking petroleum crude comprising the steps of mixing an energy transfer medium selected from a group consisting of helium, neon, argon, krypton or xenon while the crude to be cracked, the atoms of said energy transfer medium having a low ionization energy compared with the

ionization energy of the hydrogen and carbon atoms of the hydrocarbon molecule chain, the additive atoms of said energy transfer medium being selected according to which hydrocarbon fractions of the cracked crude are to be preferentially produced,

injecting said mixture into a cracking chamber in a continuous flow and in particalized form,

supplying an electrical discharge to said energy discharge medium, said electrical discharge being supplied at a relatively constant power with a floating high frequency whereby the energy transfer medium absorbs the energy contained in the high frequency electrical discharge and transmits it to the molecules of crude which are thereby controllably cracked into various fractions,



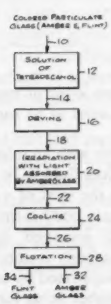
extracting the cracked crude and energy transfer medium continuously from said chamber,

separating the transfer medium from the cracked crude, and distilling the cracked crude into its component hydrocarbon fractions for storage.

4,077,871
SEPARATION OF COLORED PARTICULATE GLASS

Tribhawan Kumar, Madison, Wis., and Booker W. Morey, Pasadena, Calif., assignors to Occidental Petroleum Corporation, Los Angeles, Calif.

Filed Apr. 14, 1975, Ser. No. 567,549
Int. Cl.² B07B *13/00*
U.S. Cl. 209—4 **33 Claims**

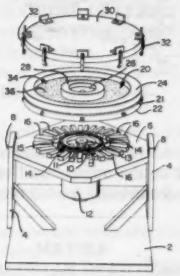


1. A process for color sorting of particulate glass, which comprises differentially heating particulate glass of at least two different colors to cause a differential heating of first glass particles of one color in said particulate glass to a temperature higher than second glass particles of a second color in said particulate glass, contacting said particulate glass including said first differentially heated glass particles with an organic thermoplastic material which melts over a narrow temperature range, said first glass particles being differentially heated to a temperature within said temperature range and causing melting of said organic thermoplastic material in contact with said first glass particles but without causing melting of said organic thermoplastic material in contact with said second glass particles, and separating said first glass particles in contact with said melted organic material from said second glass particles.

4,077,872
MAGNETIC SEPARATOR AND METHOD FOR SEPARATING MAGNETIC PARTICLES FROM NON-MAGNETIC PARTICLES

Douglas Glover, and Marvin J. Minter, both of Ann Arbor, Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.

Filed Jan. 27, 1977, Ser. No. 762,909
Int. Cl.² B03C *1/08*
U.S. Cl. 209—214 **17 Claims**



1. A magnetic separator for separating non-magnetic particles from magnetic particles comprising a framework, a plurality of magnetic means on said framework disposed in a circular pattern and arranged in alternating north-south polarity, a tray having a base comprised of a non-magnetic material and formed with an annular cavity of a size and configuration generally conforming to that of said circular pattern and adapted to be partially filled with a powder mixture, cover means removably mounted on said tray in spaced relationship from said base for closing said cavity, mounting means for mounting said tray with said base and said cavity in aligned adjacent relationship to said magnetic means, means for moving said tray to and from a load position in which said base of said tray is positioned below said cover means and an operating position in which said tray is inverted and disposed below said magnetic means, and drive means for relatively rotating said tray and said magnetic means when in said operating position to impart a tumbling action to the particles of the powder mixture in response to the traversing movement of the magnetic particles through magnetic lines of flux of alternating polarity.

4,077,873
VIBRATORY SEPARATOR

Richard K. McKibben, 618 Knight Way, La Canada, Calif. 91011

Filed Jul. 31, 1975, Ser. No. 600,641
Int. Cl.² B07B *1/38*
U.S. Cl. 209—332 **22 Claims**

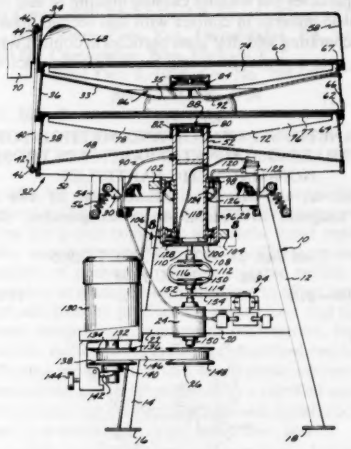
9. A vibratory device comprising:

box means mounted on a center column secured to the undersurface thereof;

a shell receiving said center column with an annular space therebetween in which are mounted upper and lower bearings extending between said column and shell;

said shell resiliently mounted on a support base for vibratory motion thereon and connected to a prime mover by a gyration isolation coupling comprising a pair of spaced-apart plates interconnected with a pair of elastomeric

bands that loop outwardly radially and axially between said plates;



and gyration generation means comprising weights eccentrically carried on the outside wall of said bearing shell to provide an eccentrically loaded bearing shell.

4,077,874

METHOD REMOVING RADIOACTIVITY FROM KAOLIN

Robert F. Conley, 2675 Deerpath La., Scotch Plains, N.J. 07076

Filed Jun. 19, 1975, Ser. No. 588,265
Int. Cl.[2] B03D *3/00*
U.S. Cl. 209—5 **13 Claims**

1. Process for the removal of at least 30% of the initial radioactivity of kaolin and over 50% of the leachable radiogenic material which comprises

a. degritting kaolin and forming a suspension of said degritted kaolin solids;

b. dispersing said degritted kaolin solids in an aqueous medium to form a dispersate;

c. slurrying said dispersate and diluting said solids with water;

d. separating from said kaolin dispersate particles of a size less than 0.5 microns diameter, by gravitational settling, by gravitational settling in conjunction with flocculation, or gravitational settling in conjunction with leaching; said size being defined by gravitational settling, and said particles containing the radioactivity to be removed.

4,077,875

COLLODION BAG CONCENTRATION ACCELERATOR AND SAMPLER

Richard D. Kremer, Keene, N.H., assignor to Carl Schleicher & Schull, Germany

Filed Jan. 31, 1977, Ser. No. 764,439
Int. Cl.[2] B01D *13/00*
U.S. Cl. 210—23 F **12 Claims**

1. An ultrafiltration apparatus for fluids, said apparatus comprising:

a container having an opening at the top thereof;

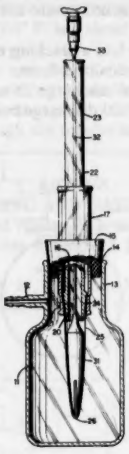
an open ended inner sleeve;

means for mounting said inner sleeve within said opening;

a collodion bag mounted on and having a closed end depending from the end of said inner sleeve within said container;

a tube extending longitudinally through said sleeve; and

a displacement body mounted on the distal end of said tube and occupying a substantial portion of the interior volume of said bag, said body having an axial bore therethrough and having a diameter less than the inner diameter of said



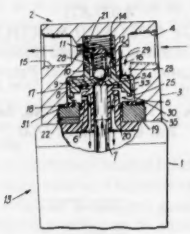
bag, the fluid being contained within said bag for diffusion through the wall of said bag.

4,077,876

SHUT-OFF VALVE APPARATUS

Kenneth Southall, Wethersfield, Conn., assignor to AMF Incorporated, White Plains, N.Y.

Continuation-in-part of Ser. No. 648,987, Jan. 14, 1976, abandoned. This application Oct. 21, 1976, Ser. No. 734,570
Int. Cl.[2] B01D *27/10*
U.S. Cl. 210—136 **3 Claims**



1. Support and flow control means for a filter cartridge having its inlet and outlet at its same upper end, said means comprising:

a main body member with an inlet opening constructed and arranged to conduct fluid to be filtered through said main body member to the inlet of a filter cartridge when supported by said main body member, and an outlet opening constructed and arranged to conduct filtered fluid through said main body member from an outlet of a filter cartridge when supported by said main body member;

said main body member being further provided with a central opening to receive and support said upper end of a filter cartridge, and an abutment means encircling said central opening;

spring biased closure means for said inlet opening displaced to an open position by a cartridge supported by said main body member and biased to a closed position to sealingly contact said abutment means when a filter cartridge is removed from said main body member; and

said closure means being provided with other means spring biased to close said outlet opening when a cartridge is

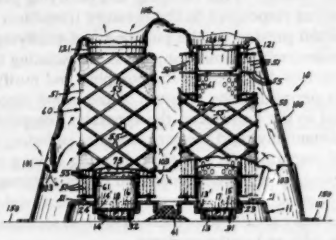
removed from said main body member and to open said outlet opening in response to flow of filtered fluid from the outlet of a filter cartridge when supported by said main body member.

4,077,877

WATER FILTRATION METHOD

Henry E. Orensten, and Vivian C. Orensten, both of 8724 Westmoreland La., St. Louis Park, Minn. 55426

Continuation-in-part of Ser. No. 613,327, Sep. 15, 1975, abandoned. This application Apr. 16, 1976, Ser. No. 677,697
The portion of the term of this patent subsequent to May 18, 1993, has been disclaimed.
Int. Cl.² E04H *3/20*
U.S. Cl. 210—17 2 Claims



1. A method for preventing the build-up of excessive ammonia levels in the water of an aquarium which utilizes a submersible air-induction water treating device and comprises the steps of:

(a) submerging said device in the water of said aquarium; said device including a generally vertically extending parallel array of replaceable filtration elements, each said filtration element having a generally vertically extending core open at its upper and lower ends;

(b) maintaining a flow of air through each of said cores of each of said filtration elements and thereby inducing water surrounding said water filtration device to flow in a circulating flow through said filtration elements and out said open upper ends of said cores;

(c) depositing a microorganism growth medium and establishing a colony of living nitrifying microorganisms at least on a filtering surface of a plurality of filtration elements, thereby obtaining a plurality of cultured replaceable filtration elements;

(d) replacing one of said cultured replaceable filtration elements with a first unclogged filtration element, and allowing nitrifying microorganisms and particulate material contained in said circulating flow to deposit at least on a filtering surface of said first unclogged filtration element and to establish a colony of living nitrifying microorganisms on said filtering surface of said first unclogged filter element;

(e) then replacing another of said at least two of said plurality of filtration elements with a second unclogged filtration element and allowing a colony of living nitrifying microorganisms to become established on a filtering surface of said second unclogged filtration element in the same manner as described in step (d);

(f) continuing to selectively replace filtration elements as described in steps (b) and (c) so that at least one of said replaceable filtration elements includes a colony of living nitrifying microorganisms at all times.

4,077,878

IN PROCESS PURIFICATION OF DRY CLEANING SOLVENTS

Herman Roy Jackson, 1981 San Marco Blvd., Jacksonville, Fla. 32207

Filed Feb. 11, 1976, Ser. No. 657,332
Int. Cl.² B01D *39/04*
U.S. Cl. 210—59 17 Claims

1. A cellulosic container device for use in removing impurities from organic dry cleaning solvents and petroleum liquids which comprises a cellulosic material which has been coated with a chromate compound, said chromate compound being sealed on said cellulosic material with a sealing compound, said cellulosic material being enclosed within a cellulosic bag which is sealed closed, said cellulosic bag having one end of at least one grounded copper wire attached thereto.

4,077,879

TREATMENT OF SULFIDE-BEARING WATERS WITH CHLORINE DIOXIDE

Carroll I. Smeck, Huntington Park, Calif., assignor to Olin Corporation, New Haven, Conn.

Filed Jun. 4, 1976, Ser. No. 693,231
Int. Cl.² C02B *1/18*
U.S. Cl. 210—62 14 Claims

1. In a process for purifying an aqueous solution containing sulfide compound contaminants wherein said aqueous solution is one in which free colloidal sulfur is formed upon treatment with a chlorine atom-containing compound, the improvement which comprises:

treating said aqueous solution with chlorine dioxide by adding the chlorine dioxide:

(i) in an amount of at least about 2.7 parts chlorine dioxide per part sulfides, measured on an unreacted chlorine dioxide weight basis; and

(ii) at a rate of at least about 0.35 parts chlorine dioxide per part sulfides per second,

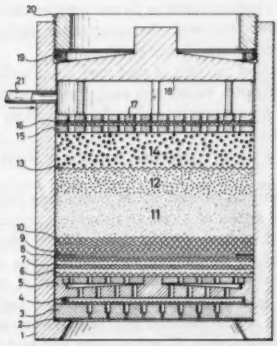
so as to remove the sulfides by oxidation thereof, and so as to simultaneously substantially retard the formation of free colloidal sulfur in said aqueous solution.

4,077,880

FILTRATION OF A LIQUID

Jürgen Lorenz, and Frank Mehdorn, both of Berlin, Germany, assignors to Spinnstoffabrik Zehlendorf Aktiengesellschaft, Berlin, Germany

Filed Sep. 20, 1974, Ser. No. 507,976
Claims priority, application Germany, Jul. 19, 1974, 2434828
Int. Cl.² B01D *37/00*
U.S. Cl. 210—65 4 Claims



1. In the process for filtering a polymer liquid through a filter pack consisting essentially of the combination of a first sieve, an intermediate sand pack and a second sieve in the direction of flow of the liquid, the improvement which com-

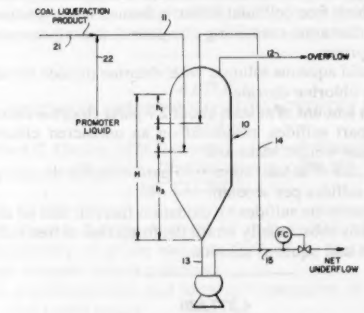
prises passing the polymer liquid through the filter pack by initially passing the liquid through said first sieve upon entering the filter pack, then through said sand pack and thence through said second sieve, while providing that the mesh of the first sieve is at most equal to the mesh width of the second sieve and the mesh width of the second sieve is smaller than the smallest particle size of sand pack, the mesh width of the second sieve being at most 80 microns.

4,077,881

SEPARATION OF INSOLUBLE MATERIAL FROM COAL LIQUEFACTION PRODUCT BY GRAVITY SETTLING

George J. Snell, Fords, N.J., assignor to The Lummus Company, Bloomfield, N.J.

Filed Jul. 8, 1976, Ser. No. 703,671
Int. Cl.² B01D *21/02*
U.S. Cl. 210—83 **4 Claims**



1. In a process for separating insoluble material from a coal liquefaction product comprised of insoluble material and carbonaceous matter dissolved in a coal liquefaction solvent in a gravity settler in the presence of a promoter liquid having a 5 volume percent distillation temperature of at least about 250° F and a 95 volume percent distillation temperature of at least about 350° F and no greater than about 750° F, said promoter liquid having a characterization factor greater than said coal liquefaction solvent and said characterization factor being at least 9.75, the improvement comprising:

introducing a feed mixture of said coal liquefaction product and said promoter liquid into said gravity settler;

withdrawing an essentially solids free overflow from said gravity settler;

withdrawing a solids containing underflow from said gravity settler;

recycling a portion of said solids containing underflow to said gravity settler at a rate to provide a recycled underflow to feed mixture weight ratio of from about 0.5:1 to 10:1, said solids containing underflow being introduced into the gravity settler above the point at which said mixture of said coal liquefaction product and said promoter liquid are introduced into said gravity settler, said points of introduction of said mixture and said solids containing underflow being separated by a vertical distance of at least 0.1 H and no greater than 0.5 H wherein H is the total height of the gravity settler; and

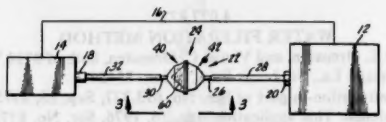
recovering a net solids containing underflow.

4,077,882

ISOLATING AND BLOOD PRESSURE TRANSMITTING APPARATUS FOR EXTRACORPOREAL BLOOD TREATMENT SYSTEM

Ronald Gangemi, 17752 Amberton La., Huntington Beach, Calif. 92646

Filed Sep. 27, 1976, Ser. No. 726,807
Int. Cl.² B01D *31/00*
U.S. Cl. 210—90 **12 Claims**



1. In combination with an extracorporeal blood treatment system having a blood pumping and purification portion for connecting to a patient, at least one pressure sensing transducer for sensing pressure in the pumping and purifying portion and control means responsive to the pressure transducer for controlling blood pressure in the pumping and purifying portion within predetermined limits, apparatus for isolating the transducer from blood flowing in the pumping and purifying portion while permitting the pressure of the blood therein to be transmitted to the transducer, the apparatus comprising:

(a) a substantially rigid pressure chamber including a gas and liquid impermeable, non-toxic housing having relatively apposing, axial pressure inlet and outlet portions

said housing having a transverse cross sectional area substantially greater than transverse cross sectional areas of the inlet and outlet portions,

(b) means for connecting the inlet portion to a blood carrying portion of the pumping and purifying portion for receiving pressurized blood therefrom and for connecting the outlet portion to the transducer for transmitting pressure of the pressurized blood thereto, and

(c) membrane means disposed transversely across the pressure chamber for physically isolating the outlet portion from the inlet portion and preventing the flow of pressurized blood therebetween

said membrane means comprising a flexible gas and fluid impermeable membrane formed into a generally frustoconical configuration and having outer peripheral edge portions connected to walls of the housing

said membrane being formed having a plurality of concentric, annular wall segments interconnected to form a collapsible staircase-like structure permitting the membrane to be extended in either axial direction and being turned inside out as it passes through a central position between extension in opposite directions in response to positive and negative pressures transmitted to an inlet portion side thereof by the pressurized blood, the membrane thereby causing pressure of the pressurized blood to be transmitted to the transducer through the outlet portion and a preselected pressure transmitting media contained between an outlet side of the membrane and the transducer.

4,077,883

REVERSE OSMOSIS SYSTEM WITH AUTOMATIC PRESSURE RELIEF VALVE

Donald Thedore Bray, Escondido, Calif., assignor to Desalination Systems, Inc., Escondido, Calif.

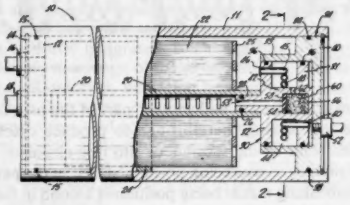
Filed Dec. 29, 1976, Ser. No. 755,217
Int. Cl.² B01D *13/00*
U.S. Cl. 210—136 **7 Claims**

1. Reverse osmosis apparatus comprising a semipermeable membrane cartridge enclosed in a pressure resistant container; means for introducing pressurized liquid to be purified into said pressure resistant container and into said semipermeable mem-

brane cartridge; means for releasing concentrated liquid from said semipermeable membrane cartridge and from said pressure resistant container while maintaining operating pressure therein; and means for collecting purified liquid from said semipermeable membrane cartridge; in which the improvements comprise:

a. said means for releasing said concentrated liquid from said pressure resistant container while maintaining operating pressure therein comprising an elongated small duct;

b. said elongated small duct comprising two portions, one end of said portions communicating with the concentrate outlet end of said semipermeable membrane cartridge, one end of one of said portions communicating with means for



disposal of said concentrated liquid, and the other ends of both of said portions of said duct communicating with the interior of a common compartment;

c. said compartment sealed except for passage means provided with a check valve between the interior of said compartment and said means for collecting purified water from said semipermeable membrane cartridge; and

d. said check valve adapted to close when the pressure of liquid within said common compartment exceeds the pressure of purified liquid in said means for collecting purified liquid, and said check valve adapted to open when the pressure of purified liquid in said means for collecting purified liquid exceeds the pressure of liquid within said common compartment.

4,077,884

FUEL TANK ASSEMBLY

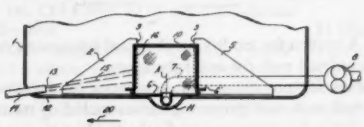
Fritz Albert Naumann, Stammham, Germany, assignor to Audi NSU Auto Union AG, Neckarsulm, Germany

Filed Nov. 26, 1975, Ser. No. 635,633

Claims priority, application Germany, Nov. 29, 1974, 2456525

Int. Cl.² E03B *11/00*; B65D *87/12*

U.S. Cl. 210—172 **4 Claims**



1. A fuel-tank assembly comprising:

a fuel tank having a floor and sides and adapted to hold a quantity of liquid fuel;

a recess in the floor of said tank, said recess being open upwardly;

an inverted cup of fibrous material forming a filter and positioned over said recess, said cup having a cylindrical periphery;

a first pipe lying in said recess and opening into said cup for withdrawing fuel from said tank through said filter;

a plurality of upright baffles in said tank secured to said floor and terminating adjacent said cup, said baffles being angularly spaced around said cup;

a further pipe opening into said tank and inclined upwardly while being trained on said periphery of said cup for directing a jet of recirculated heated fuel upwardly and radially against the exterior of said cup; and

means for withdrawing fuel through said first pipe and recirculating heated fuel to said tank through said further pipe.

4,077,885

COMPOSITE DYNAMIC MEMBRANE

Jan Willem van Heuven, Apeldoorn, and Roelof Karl Bloebaum, Vaassen, both of Netherlands, assignors to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, The Hague, Netherlands

Filed Dec. 12, 1975, Ser. No. 640,067

Claims priority, application Netherlands, Dec. 20, 1974, 7416645

Int. Cl.² B01J *31/00*

U.S. Cl. 210—193 **6 Claims**

1. An improved device for effecting reverse osmosis, provided with a dynamically formed membrane, which is composed of a porous supporting device, an intermediate layer of an inert material consisting essentially of a member selected from the group consisting of glass fibers and asbestos fibers that is hardly or not deformable and a layer of membrane-forming material, wherein the improvement comprises that on the intermediate layer a second layer comprising granular inert material selected from the group consisting of silicon dioxide and carbon black is provided, of a substantially smaller diameter, the ratio between the particle diameter of this last mentioned material and that of the intermediate layer being between 1:10 and 1:1,000.

4,077,886

CENTRIFUGAL LIQUID CHROMATOGRAPH

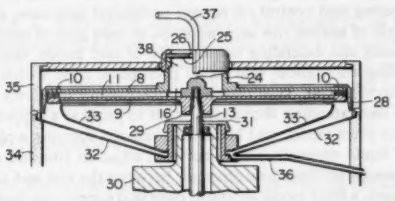
Tosao Fukuda, Kiryu, and Hiroshi Takahashi, Ooarai, both of Japan, assignors to Japan Servo Co., Ltd., Tokyo, Japan

Filed Jan. 27, 1976, Ser. No. 652,846

Claims priority, application Japan, Jan. 28, 1975, 50/10957

Int. Cl.² B01D *15/08*

U.S. Cl. 210—198 C **6 Claims**



1. A centrifugal liquid chromatograph comprising;

separating means consisting of a pair of upper and lower horizontal discs which are vertically arranged in spaced-apart relationship with respect to each other, and a porous spacer disposed between said pair of discs along the circumference thereof, said separating means having a space defined between said pair of discs and filled with a separating medium, said upper disc having a central inlet port, through which a sample and a developer are to be fed to said separating means, said porous spacer consisting of a rigid core wire having a ring shape and a coil of rigid wire of a considerably small gauge wound around said rigid core wire in a spiral form at substantially a constant pitch and a tape of porous material closely adhered to the coil of rigid wire of considerably small gauge in a manner to fill the respective gaps between the adjoining wires of a considerably small gauge;

a drive unit for rotating said separating means in a manner to permit adjustment of the r.p.m. thereof, and for forcing components separated from a sample towards the circum-

ferential portion of said separating means due to centrifugal force; and

detecting means for receiving the sample forced out from the outer circumferential portion of said separating means and detecting components separated from the sample.

4,077,887

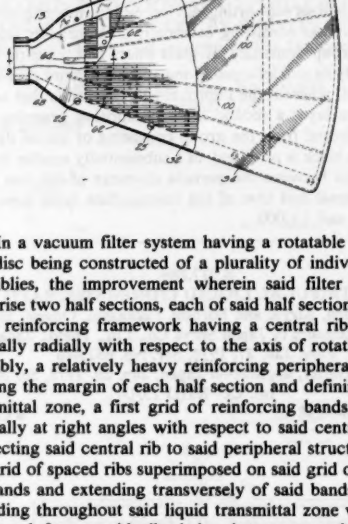
FILTER DISC FOR VACUUM FILTER SYSTEM

Sigmund Coll Langvik, P.O. Box 84, 1312 Slependen, Norway

Filed May 17, 1977, Ser. No. 797,886

Int. Cl.² B01D *25/04*

U.S. Cl. 210—331 **4 Claims**



1. In a vacuum filter system having a rotatable filter disc, said disc being constructed of a plurality of individual filter assemblies, the improvement wherein said filter assemblies comprise two half sections, each of said half sections comprising a reinforcing framework having a central rib extending generally radially with respect to the axis of rotation of said assembly, a relatively heavy reinforcing peripheral structure forming the margin of each half section and defining a liquid transmittal zone, a first grid of reinforcing bands extending generally at right angles with respect to said central rib and connecting said central rib to said peripheral structure, a second grid of spaced ribs superimposed on said grid of reinforcing bands and extending transversely of said bands, said ribs extending throughout said liquid transmittal zone within said peripheral frame, said ribs being interconnected with said bands and extending above said bands to provide a supporting face for filter media, said bands and said ribs forming a plurality of liquid transmittal slots between adjacent ribs and adjacent bands and fluid flow channels between the ribs and above the bands, a filter media arranged over said supporting face and supported on said face and said ribs supporting the filter media above said slots in said channels, said slots affording vacuum communication with said filter media surface portions directly opposite said slots and filter media portions above said channels to cause fluid flow upon the application of vacuum from the media surface directly into said slots from the media surface opposite said slots and flow from the media surface opposite said channels into said channels and from said channels into said slots, and means for fastening said half sections together to seal the peripheral framework about the fluid transmittal zones.

4,077,888

ARC DISCHARGE APPARATUS

John Stewart Rhoades, P.O. Box 197, Exton, Pa. 19341, and Gary Kulp, Blackberry La., R.D. 1, Box 185, Malvern, Pa. 19355

Filed Dec. 8, 1975, Ser. No. 638,707

Int. Cl.² B01K *1/00*

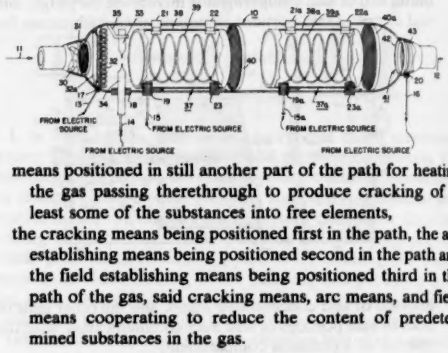
U.S. Cl. 250—543 **19 Claims**

1. In a system for treating substances which are in the form of a gas within which there may also be entrained particulates, the system comprising a confined path along which said substances move, the improvement comprising:

means for establishing in a predetermined portion of the path an electric field;

a metal having an affinity for at least one said substance, said affinity metal being positioned in the same portion of the path as the field establishing means;

means for establishing an electric arc across another portion of the path; and



means positioned in still another part of the path for heating the gas passing therethrough to produce cracking of at least some of the substances into free elements,

the cracking means being positioned first in the path, the arc establishing means being positioned second in the path and the field establishing means being positioned third in the path of the gas, said cracking means, arc means, and field means cooperating to reduce the content of predetermined substances in the gas.

4,077,889

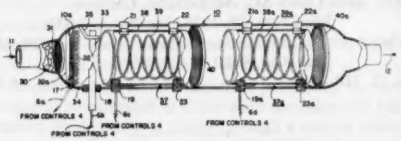
ARC DISCHARGE APPARATUS

John Stewart Rhoades, P.O. Box 197, Exton, Pa. 19341, and Gary Kulp, Blackberry La., R.D. 1, Box 185, Malvern, Pa. 19355

Continuation-in-part of Ser. No. 638,707, Dec. 8, 1975. This application Mar. 17, 1976, Ser. No. 667,880

Int. Cl.² B01K *1/00*

U.S. Cl. 250—543 **10 Claims**



1. A system for modifying chemical substances, comprising:

a confined path for said substances;

means for preparing said substances for introduction into said path, said preparing means including means for gasifying the substances or finely dividing them and entraining them in a gaseous medium;

means for introducing the prepared substances into the path;

electrically energizeable means for establishing in a predetermined portion of the path an electric field;

a metal having an affinity for at least one said substance, the affinity metal being positioned in the same portion of the path as the field establishing means;

electrically energizeable means for establishing an electric arc across another portion of the confined path; and

electrically energizeable means positioned in still another part of the path for heating the substances passing therethrough to produce cracking of at least some of the substances into free elements,

the arc means and cracking means being both positioned in the path upstream from the electric field means.

4,077,890

COMPOSITION FOR TREATING FABRICS, METHOD FOR MAKING AND USING THE SAME

Graham Barker, 16-11 Berdan Ave., Fairlawn, Bergen County, N.J. 07410

Continuation-in-part of Ser. No. 335,311, Feb. 23, 1973, abandoned. This application Jul. 8, 1974, Ser. No. 486,351

Int. Cl.[2] D06M *13/16, 13/18, 3/46*

U.S. Cl. 252—8.8 15 Claims

1. A solid, shaped composition for treating fabric materials to impart desired properties thereto comprising a homogeneous mixture, based on 100% solids on a dry weight basis, of 0.1 to 20% by weight of a water soluble or dispersible film former adhesive and 25 to 99.9% by weight of adjuvant capable of imparting desired softness, brightness, fragrance, antistatic, germicidal and/or soil release properties to said fabric materials, said adhesive being present in an amount to form with said adjuvant a uniform, integrated, self-supporting cellular foam having a density in a range of 0.2 to 0.8, and a bubble size in a range of 5 to 50 microns, said foam being dried to a moisture content of less than about 2% and maintaining a given shape under external stress, said composition being disintegrable over an extended period of time under agitation upon the application of warm air and in the presence of moisture to release substantially all of said adjuvants and to leave substantially no residue of said adhesive.

4,077,891

FABRIC TREATMENT COMPOSITIONS

Wayne Edward Beimesch, Covington, Ky., and Michael Andrew Walsh, Fairfield, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Aug. 20, 1976, Ser. No. 716,302

Int. Cl.[2] D06M *13/20*

U.S. Cl. 252—8.8 21 Claims

1. An article of manufacture adapted for providing fabric softening within an automatic clothes dryer, said article comprising:

(a) a fabric softening amount of a softening composition containing a formic acid salt of a long chain primary amine softener component , said long chain having from about 12 to 22 carbon atoms; and

(b) a dispensing means which provides for release of said softening composition within an automatic laundry dryer at dryer operating temperatures.

4,077,892

LUBRICANT COMPOSITION

Gerassimos Frangatos, Cherry Hill, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Apr. 20, 1977, Ser. No. 789,171

Int. Cl.[2] C10M *1/10, 3/02, 5/02, 7/02*

U.S. Cl. 252—49.9 11 Claims

1. A lubricant composition comprising a major amount of a lubricant and a minor, antiwear or load carrying amount of a product made by reacting a partially esterified polyfunctional alcohol with a phosphorus trihalide or a dihydrocarbyl phosphonate.

4,077,893

STAR-SHAPED DISPERSANT VISCOSITY INDEX IMPROVER

Thomas E. Kiovsky, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 11, 1977, Ser. No. 795,676

Int. Cl.[2] C10M *1/28;* C08L *9/06, 47/00*

U.S. Cl. 252—56 R 14 Claims

1. The oil-soluble product prepared by the process comprising:

a. reacting a selectively hydrogenated star-shaped polymer with an alpha-beta unsaturated carboxylic acid, anhydride or ester at a temperature of between about 150° C and about 300° C for between about 1 hour and about 20 hours wherein said star-shaped polymer comprises a poly (polyalkenyl coupling agent) nucleus and at least four polymeric arms linked to said nucleus wherein said polymeric arms are selected from the group consisting of:

(i) hydrogenated homopolymers and hydrogenated copolymers of conjugated dienes;

(ii) hydrogenated copolymers of conjugated dienes and monoalkenyl arenes; and

(iii) mixtures thereof;

and wherein at least about 80% of the aliphatic unsaturation of the starshaped polymer has been reduced by hydrogenation while less than 20% of the aromatic unsaturation has been reduced; and

b. reacting the product of step (a) with an alkane polyol having at least two hydroxy groups at a temperature of between about 150° C and about 250° C.

4,077,894

GLYCOL ANTIFREEZE MIXTURES

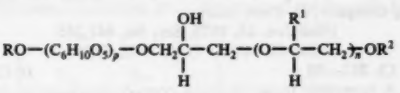
William Keith Langdon, Grosse Ile, and Daniel Ronan Dutton, Woodhaven, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Dec. 27, 1976, Ser. No. 754,562

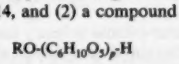
Int. Cl.[2] B01D *19/04;* C09K *5/00*

U.S. Cl. 252—76 10 Claims

1. In an antifreeze composition comprising a glycol freezing point depressant and a corrosion inhibitor system, a foam suppressing agent present in an amount of from about 0.001% to about 1.0% by weight of the antifreeze composition and consisting essentially of a mixture of (1) a compound having the formula



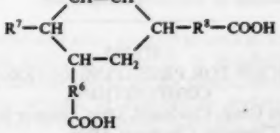
wherein R is an alkyl, alkoxyalkyl, hydroxyalkyl, or dihydroxyalkyl having from 1 to 6 carbon atoms, R^1 is hydrogen, methyl or ethyl, R^2 is an alkyl group having 1 to 8 carbon atoms, p is an integer from 1 to 20, and n is an integer from 1 to 14, and (2) a compound having the formula



wherein R and p are as defined above, and wherein the weight ratio of compound (1) and compound (2) are from about 1:10 to 10:1.

4. An antifreeze composition as defined in claim 1, in which the corrosion inhibitor system comprises from 0.01% to 1% by weight of the antifreeze of at least one substance selected from the group consisting of

a. compounds corresponding to the structural formula



wherein R^6 is an alkylene radical containing from 0 to 12 carbon atoms, R^7 is an alkyl radical containing from 1 to 10 carbon atoms and R^8 is an alkylene radical containing from 1 to 12 carbon atoms, and

b. the mono- and di- metal salts, the mono- and di- ammonium salts, and the mono- and di- amides of a.

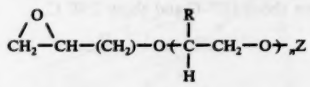
4,077,895

GLYCOL ANTIFREEZE MIXTURES

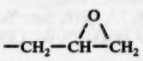
William Keith Langdon, Grosse Ile, and Daniel Ronan Dutton, Woodhaven, both of Mich., assignors to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Jan. 3, 1977, Ser. No. 756,177
Int. Cl.[2] B01D 19/04; C09K 5/00
U.S. Cl. 252—76 6 Claims

1. An antifreeze composition comprising a glycol freezing point depressant, a corrosion inhibitor system, and a foam suppressing agent present in an amount of from about 0.0001% to about 1.0% by weight of the antifreeze composition; said foam suppressing agent comprising the reaction mixture obtained by reacting a polyglycerol having from 5 to 30 glycerol units, and a glycidyl ether having the formula



wherein n is an integer from 1 to 20, R is hydrogen, methyl or ethyl, and Z is an alkyl group having from 1 to 8 carbon atoms or the group having the formula



with the mole ratio of the reactants being from 0.5 to 1.2 moles of glycidyl ether or diglycidyl ether per mole of polyglycerol.

4,077,896

WAX-STRIPPING CLEANING COMPOSITION

Frederick J. Bunegar, Denver, Colo., and Sheila A. Tesch, St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 15, 1975, Ser. No. 541,255
Int. Cl.[2] C11D 7/50, 7/32, 7/26
U.S. Cl. 252—90 10 Claims

1. A sprayable liquid cleaning composition suitable for removing heavy wax build-up and soil from baseboards, cleaning floors and stair areas where floor cleaning machines cannot reach, cleaning soap residue from ceramic tile and grouting and shower areas, and in other areas, consisting essentially of

1. 1–25 parts by weight of a water-soluble monobutyl glycol ether organic solvent;
2. 3–10 parts by weight of a water-soluble primary amine having the formula NH_2R wherein R is a lower alkyl group having from 1 to 5 carbon atoms, a monohydroxyalkyl group having from 1 to 3 carbon atoms, an aminoalkyl group having from 2 to 3 carbon atoms or hydrogen, the pH of said composition being less than 12 wherein the minimum quantity of said amine and said monobutyl glycol ether organic solvent in said composition is calculated by the expression $(x+1)y = 25$, where "x" represents the parts by weight organic solvent and "y" represents the parts by weight primary amine per 100 parts by weight of said composition, and where "x" is greater than zero and "y" is greater than 1; and
3. the remainder of 100 parts being water.

4,077,897

PROCESS FOR PREPARING DETERGENT COMPOSITIONS

Terrell Wilson Gault, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Feb. 13, 1976, Ser. No. 657,991
Int. Cl.[2] C11D 7/38
U.S. Cl. 252—99 13 Claims

1. A process for preparing a granular detergent composition comprising the steps of:

(a) forming a particulate mixture comprising from about 5% to about 35% by weight of the composition of an anhydrous alkaline condensed phosphate and from about 3% to about 10% by weight of the composition of anhydrous alkali metal silicate having a particle size in the range from about 125 to about 300 mesh; and

(b) with continuous mixing, spraying said particulate mixture with from about 10% to about 35% by weight of the composition of an aqueous solution of an alkali metal silicate having an SiO_2/alkali metal oxide ratio in the range from about 1.0 to about 3.6 to form agglomerated granules.

4,077,898

IODINE/PHOSPHATE ESTER COMPOSITIONS AND METHODS OF USING THEM

Larry M. Rue, Inver Grove Heights, Minn., assignor to Economics Laboratory, Inc., St. Paul, Minn.

Continuation-in-part of Ser. No. 738,004, Nov. 2, 1976, abandoned, which is a continuation-in-part of Ser. No. 544,389, Jan. 27, 1975, abandoned, which is a continuation-in-part of Ser. No. 62,727, Aug. 10, 1970, abandoned. This application Jan. 17, 1977, Ser. No. 759,654
Int. Cl.[2] C11D 3/48, 7/36
U.S. Cl. 252—106 12 Claims

1. A method for sanitizing containers with a storage stable liquid composition having germicidal properties, said liquid composition comprising:

(a) a phosphate ester of ethoxylated C_8–C_{18} saturated aliphatic monohydric alcohol, which ester has been neutralized with an approximately stoichiometric number of equivalents of at least one ethanolamine selected from the group consisting of mono-, di-, and triethanolamine to a pH of 4.5–7.0 determined on a 1% aqueous solution, said ethoxylated alcohol containing 2–4 moles of ethylene oxide per mole of alcohol, each mole of said phosphate ester containing 1–1.5 moles of ethoxylated alcohol; and

(b) 5–30% by weight of iodine, based on the weight of said ethanolamine neutralized phosphate ester; and

(c) water, comprising the steps of:

(1) contacting the interior surfaces of said containers with said liquid composition; and

(2) draining said liquid composition from said containers, through an opening in said containers, essentially by means of a gravity flow.

12. A method for making a storage stable, liquid composition having germicidal properties, said method comprising the steps of:

(a) neutralizing a phosphate ester of ethoxylated C_8–C_{18} saturated aliphatic monohydric alcohol, said ethoxylated alcohol containing 2–4 moles of ethylene oxide per mole of alcohol, each mole of said phosphate ester containing 1–1.5 moles of ethoxylated alcohol, said neutralizing being carried out with an approximately stoichiometric number of equivalents of triethanolamine, whereby the pH of the resulting neutralized phosphate ester, when determined in 1% aqueous solution, is about 6;

(b) adding 5–30% by weight of iodine, based on the weight of said neutralized phosphate ester, to said neutralized phosphate ester, whereby said iodine is stably complexed by said neutralized phosphate ester;

(c) diluting the product of step (b) with water;

(d) reducing the viscosity of the product of step (c) by adding up to 5% by weight, based on the weight of the product of step (c), of ethylene glycol monobutyl ether; and

(e) lowering the pH of the product of step (d) to less than 6.0 but more than 0.5 with at least one acid selected from the group consisting of phosphoric acid and hydroxyacetic acid.

4,077,899

GETTERING DEVICE OF MANUFACTURING A COLOR TELEVISION DISPLAY TUBE WHILE USING SAID GETTERING DEVICE, AND COLOR TELEVISION DISPLAY TUBE THUS MANUFACTURED

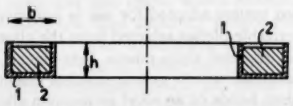
Wilhelmus Adrianus van Gils, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 23, 1976, Ser. No. 725,783

Claims priority, application Netherlands, Sep. 30, 1975, 7511482

Int. Cl.² H01J 7/18, 35/20

U.S. Cl. 252—181.4 4 Claims



1. A gettering device comprising a powder mixture of nickel and a barium-aluminium alloy, compressed in a metal holder from which barium as the gettering metal can be evaporated by heating, said mixture comprising 40 to 60% by weight of nickel powder, said nickel powder having a specific surface smaller than 0.15 m^2 per gram and an average grain size smaller than 80 microns, the barium-aluminium powder having an average grain size smaller than 125 microns, and wherein the specific surface area of said metal powder increases as the grain size decreases.

4,077,900

LIQUID CRYSTALLINE DIELECTRIC COMPOSITION

Ludwig Pohl; Rainer Klink; Joachim Krause; Rudolf Eidenschink, and Fernando Del Pino, all of Darmstadt, Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

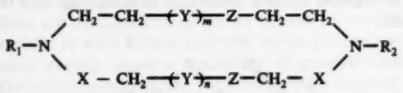
Filed Mar. 8, 1977, Ser. No. 775,671

Claims priority, application Germany, Mar. 18, 1976, 2611453; Aug. 20, 1976, 2637430

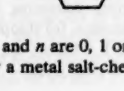
Int. Cl.² G02F 1/13; C09K 3/34

U.S. Cl. 252—299 9 Claims

1. In a liquid crystalline dielectric composition comprising at least one liquid crystalline compound, the improvement wherein the composition, when disposed between the electrode surfaces of electro-optical indicator elements, is rendered capable of assuming a stable parallel orientation with the electrode surfaces by the presence therein of 0.001 to 5% by weight of an amino compound of the formula



wherein R_1 and R_2 each are hydrogen or collectively are $CH_2-(CH_2-Z-CH_2)_p-CH_2$; X is $-CH_2-$ or $-CO-$; Y is $-Z-CH_2-CH_2-$ or



Z is O, S or NH; m and n are 0, 1 or 2 and p is 1, 2 or 3 or an acid-addition salt or a metal salt-chelate complex thereof.

4,077,901

ENCAPSULATION OF NUCLEAR WASTES

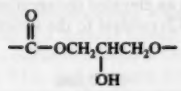
John L. Arnold, 1305 Love, and Raymond W. Boyle, 2900 Gibson, both of Midland, Mich. 48640

Filed Oct. 3, 1975, Ser. No. 619,329

Int. Cl.² G21F 9/16

U.S. Cl. 252—301.1 W 19 Claims

1. A method for encapsulating liquid waste materials comprising uniformly dispersing said waste material into a fluid thermosettable resin composition of (1) a vinyl ester resin prepared by reacting about equivalent proportions of an unsaturated monocarboxylic acid and a polyepoxide resin, said vinyl ester resin containing



linkage groups and terminal vinylidene groups attached to the ester end of said linkage or (2) an unsaturated polyester or (3) mixture thereof and a catalyst for curing said resin, and curing said composition under conditions that the exotherm is maintained below 100° C.

4,077,902

NICKEL STABILIZERS FOR SYNTHETIC POLYMERS

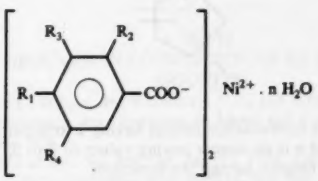
Paul Moser, Riehen, and Jean Rody, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 524,684, Nov. 18, 1974, abandoned. This application Mar. 3, 1976, Ser. No. 663,333

Int. Cl.² C08K 5/52, 5/53

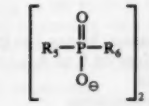
U.S. Cl. 252—400 A 11 Claims

1. Mixtures consisting of a compound of the formula I



(I)

wherein either R_1 represents a hydroxyl group and R_2 represents hydrogen or R_1 represents hydrogen and R_2 represents a hydroxyl group, R_3 and R_4 independently of one another represent hydrogen or alkyl, and n represents a value from 0 to 2, and a compound of the formula II



(II)

wherein R_5 represents alkyl, cycloalkyl, aralkyl, aryl or aralkyl or aryl groups which are mono-, di- or tri-substituted by hydroxyl, alkyl, chlorine and/or alkoxy groups, alkoxy, cycloalkoxy, aralkoxy, aryloxy, or aralkoxy or aryloxy which are mono-substituted or di-substituted in the aryl radical by alkyl, chlorine and/or alkoxy, R_6 represents hydrogen, alkyl, cycloalkyl, aralkyl, aryl or aralkyl or aryl groups which are mono-, di- or tri-substituted by hydroxyl, alkyl, chlorine and/or alkoxy groups, alkoxy, cycloalkoxy, aralkoxy, aryloxy or aralkoxy or aryloxy which are mono-substituted or di-substituted in the aryl radical by alkyl, chlorine and/or alkoxy, and m represents a value from 0 to 2.5.

4,077,903
PREPARATION OF AN ACTIVE OLEFIN POLYMERIZATION CATALYST

Harry J. Wristers, Baytown, Tex., assignor to Exxon Research & Engineering Co., Linden, N.J.

Filed Nov. 26, 1975, Ser. No. 635,316
Int. Cl.[2] B01J *31/02, 27/06*
U.S. Cl. 252—429 C **10 Claims**

1. A process of preparing $TiCl_3.nAlCl_3$ catalysts where n = 0.25 to 0.35 having a mean particle diameter size of from 10 to 200 microns and narrow particle size distribution which consists of reducing $TiCl_4$ with a mixture of $AlEt_3$ + $AlEt_2Cl$ wherein the mole ratio of $AlEt_3$ to $TiCl_4$ is from 0.01 to 0.15:1 at a reduced temperature of from about −50° to about 0° C, gradually raising to an elevated temperature sufficient to convert the $TiCl_3$.$nAlCl_3$ catalyst to the violet form.

4,077,904
OLEFIN POLYMERIZATION PROCESS AND CATALYST THEREFOR

Allen Noshay, East Brunswick, and Frederick John Karol, Belle Mead, both of N.J., assignors to Union Carbide Corporation, New York, N.Y.

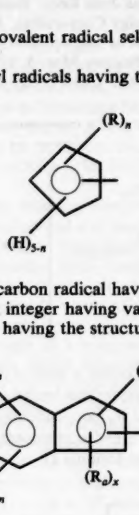
Filed Jun. 29, 1976, Ser. No. 700,843
Int. Cl.[2] C08F *4/02, 4/78*
U.S. Cl. 252—429 R **14 Claims**

1. Catalyst composition comprising at least one organochromium compound having the structure:

$$Ar_1 - Cr\ (II) - Ar_1$$

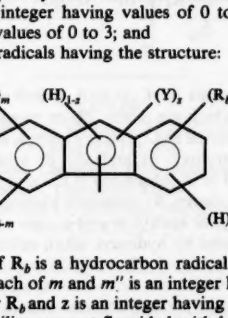
wherein Ar_1 is a monovalent radical selected from the group consisting of:

(1) cyclopentadienyl radicals having the structure:



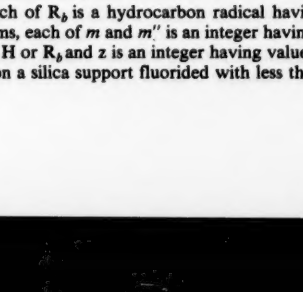
wherein R is a hydrocarbon radical having 1 to about 20 carbon atoms and n is an integer having values of 0 to 5;

(2) indenyl radicals having the structure:



wherein each R_a is a hydrocarbon radical having 1 to 10 carbon atoms, m is an integer having values of 0 to 4, and x is an integer having values of 0 to 3; and

(3) fluorenyl radicals having the structure:



wherein each of R_b is a hydrocarbon radical having 1 to 10 carbon atoms, each of m and m'' is an integer having values of 0 to 4, Y is H or R_b and z is an integer having values of 0 to 1; deposited on a silica support fluorided with less than 10% by weight of a fluoridation agent, based on the weight of said support, at a temperature of about 100° C. to about 400° C.

4,077,905
NOVEL CATALYST SYSTEM

Long Shyong Wang, Stamford, and Erwin Richard Ruckel, Darien, both of Conn., assignors to Arizona Chemical Company, Wayne, N.J.

Continuation of Ser. No. 576,936, May 12, 1975, Pat. No. 4,011,385. This application Oct. 12, 1976, Ser. No. 731,271
Int. Cl.[2] C08F *4/72*
U.S. Cl. 252—429 A **8 Claims**

1. A catalyst system adapted for use in polymerizing difficultly polymerizable olefins selected from the class consisting of isobutylene, isoprene, alpha-pinene, beta-pinene, camphene, dipentene, limonene, which system consists essentially of an alkyl germanium halide or an alkyl germanium alkoxide or an aryl germanium halide and aluminum chloride or aluminum bromide or mixtures of the latter, the ratio of the said alkyl or aryl germanium halide or alkoxide to aluminum chloride or aluminum bromide ranging from 0.1 to 1.5, weight percent, based on the olefin monomer employed, and from 2 to 10, weight percent, based on the olefin monomer employed, respectively.

4,077,906
POLYBENZIMIDAZOLE FIBER SUPPORTED CATALYST

O. Richard Hughes, Chatham Township, County of Union, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 624,798, Oct. 22, 1975. This application Apr. 1, 1977, Ser. No. 783,693
Int. Cl.[2] B01J *31/12, 31/28;* C07F *15/00*
U.S. Cl. 252—431 C **8 Claims**

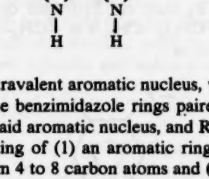
1. A fiber supported insolubilized catalyst useful in hydroformylation reactions comprising;

a. a rhodium carbonyl complex $[Rh(CO)_nX_y]^a{}_2$, where a may vary from 0 to −2, n may vary from 1 to 2, y may vary from 1 to 2, and X is a member selected from the group consisting essentially of a halogen, carboxylate, nitrate, thiocyanate and sulfate reacted with

b. a polybenzimidazole fiber support wherein said rhodium carbonyl complex forms a polybenzimidazole complex with the benzimidazole units of the polybenzimidazole fiber surface thereby acting as donor ligands for said rhodium carbonyl complex.

2. The catalyst of claim 1 wherein $a = o$, $n = 2$, $y = 1$, and X = chlorine in said rhodium carbonyl complex.

3. The catalyst of claim 1 wherein said polybenzimidazole fibrous material consists essentially of recurring units of the formula:



wherein R is a tetravalent aromatic nucleus, with the nitrogen atoms forming the benzimidazole rings paired upon adjacent carbon atoms of said aromatic nucleus, and R′ is selected from the group consisting of (1) an aromatic ring, (2) an alkylene group having from 4 to 8 carbon atoms and (3) a heterocyclic ring selected from the group consisting of (a) pyridine, (b) pyrazine, (c) furan, (d) quinoline, (e) thiophene, and (f) pyran.

4. The catalyst of claim 1 wherein the polybenzimidazole fiber support is poly-2,2′-(m-phenylene)-5,5′-bibenzimidazole.

4,077,907

CATALYST FOR SYNTHESIZING LOW BOILING ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN

Surjit Singh Khera, Upper Arlington, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Division of Ser. No. 635,845, Nov. 28, 1975. This application May 16, 1977, Ser. No. 796,890
Int. Cl.[2] B01J *21/04, 23/80, 27/04*
U.S. Cl. 252—439 4 Claims

1. A catalyst for use in the synthesis of low boiling aliphatic hydrocarbons from hydrogen and carbon monoxide which comprises a sulfided, interspersed mixture of cobalt oxide aluminum oxide and zinc oxide, which mixture by elemental analysis contains less than about 0.5 weight percent of alkali metal, said catalyst prior to sulfiding comprising about 1 to about 15 weight percent of cobalt oxide, about 55 to about 85 weight percent of aluminum oxide and about 15 to about 30 weight percent of zinc oxide, the sulfur content by elemental analysis of the catalyst comprising about 2.0 to about 12.0 percent by weight of the final catalyst composition.

4,077,908

PRODUCTION OF MATERIAL CONSISTING OF SOLID HOLLOW SPHEROIDS

Jurgen Stenzel, Erftstadt Liblar, and Arnulf Hinz, Hurth-Knapsack, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Claimed priority, application Germany, Oct. 26, 1913, Germany 2355631
Continuation of Ser. No. 536,735, Dec. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 517,213, Oct. 23, 1974, abandoned. This application Sep. 3, 1976, Ser. No. 720,346
Int. Cl.[2] B01J *29/06*
U.S. Cl. 252—455 R 13 Claims

1. A process for making carrier material supporting motor exhaust gas decontamination catalysts, said carrier consisting essentially of solid hollow globules, which process comprises placing starting material consisting of spheroidal particles of sawdust having a diameter within the range 1 and 5 mm on to a pelletizing table, and spraying an aqueous cellulose ether solution thereonto so as to wet the particles' surface; distributing pulverized aluminum hydroxide, hydrous aluminum silicate or mixtures thereof over the wetted surface of the spheroidal sawdust particles; thereby causing said aluminum hydroxide, hydrous aluminum silicate or mixtures thereof to deposit on said sawdust particles; drying the resulting pellets at temperatures within the range 20° and 95° C; burning out the sawdust from the pellets; and calcining the pellets at temperatures within the range 1000° and 1500° C with the resultant formation of said solid hollow globules having an inner diameter within the range 2 to 10 mm and a wall thickness of at least 1 mm.

6. A process for making carrier material supporting motor exhaust gas decontamination catalysts, said carrier consisting essentially of solid hollow globules, which process comprises placing starting material consisting of granular spheroidal polyethylene or polystyrene particles having a diameter within the range 1 and 5 mm on to a pelletizing table, and spraying an aqueous cellulose ether solution thereonto so as to wet the particles' surface; distributing pulverized aluminum hydroxide, hydrous aluminum silicate or mixtures thereof over the wetted surface of the granular spheroidal polyethylene or polystyrene particles; thereby causing said aluminum hydroxide, hydrous aluminum silicate or mixtures thereof to deposit on said polyethylene or polystyrene particles; drying the resulting pellets at temperatures within the range 20° and 95° C, freeing the pellets of the granular spheroidal polyethylene or polystyrene particles; and calcining the pellets at temperatures within the range 1000° and 1500° C with the resultant formation of said hollow globules having an inner diameter within the range 2 to 10 mm and a wall thickness of at least 1 mm.

4,077,909

NON-NOBLE-METAL-MORDENITE REFORMING CATALYST

Ralph J. Bertolacini, Chesterton, Ind., and Harry M. Brennan, Naperville, Ill., assignors to Standard Oil Company (Indiana), Chicago, Ill.

Continuation-in-part of Ser. No. 364,030, May 25, 1973, abandoned, which is a continuation of Ser. No. 115,613, Feb. 16, 1971, abandoned. This application Mar. 17, 1975, Ser. No. 559,055
Int. Cl.[2] B01J *29/06;* C10G *35/06*
U.S. Cl. 252—455 Z 12 Claims

1. A catalytic composition for the reforming of petroleum hydrocarbons, which catalytic composition comprises a hydrogenation component comprising a member selected from the group consisting of a metal of Group VIA of the Periodic Table of Elements, oxides of a metal of Group VIA, sulfides of a metal of Group VIA, and mixtures thereof supported on a co-catalytic solid support comprising mordenite and a porous, halogen-free refractory inorganic oxide, said mordenite having a silica-to-alumina ratio within the range of about 6 to about 100, the preparation of said catalytic composition comprising blending finely-divided mordenite-type aluminosilicate material into a sol or gel of said refractory inorganic oxide to form a blend, gelling said blend, if a sol is present, to form a gel by adding a solution of a suitable inorganic ammonium-affording compound, and drying and calcining the gel to form a calcined material.

2. The catalytic composition of claim 1, the preparation of which further comprises adding a soluble compound of said metal of Group VIA to said blend prior to said drying and calcining.

3. The catalytic composition of claim 1, the preparation of which further comprises impregnating said calcined material with a soluble compound of said metal to Group VIA to form an impregnated material, drying and calcining said impregnated material to form said catalytic composition.

4,077,910

HYDROCARBON CONVERSION OVER ACTIVATED ERIONITE

Robert C. Wilson, Jr., Woodbury, N.J., and Albert B. Schwartz, Philadelphia, Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 586,130, Jun. 12, 1976, Pat. No. 4,021,332. This application Dec. 1, 1976, Ser. No. 746,352
Int. Cl.[2] B01J *29/06*
U.S. Cl. 252—455 Z 14 Claims

1. A crystalline aluminosilicate erionite zeolite catalyst prepared by the steps comprising (1) calcining erionite in a gas having a low partial pressure of water at from about 900° F to about 1500° F, (2) contacting at least once with ammonium ions, (3) contacting with cations of a polyvalent metal, (4) calcining as set forth in (1), (5) contacting with ammonium ions, (6) contacting with nickel cations and (7) calcining in a gas as defined in (1) at from about 800° F to about 1400° F.

2. The catalyst of claim 1 in which the metal introduced in step (3) is calcium.

4,077,911

LIQUID DETERGENT OF REDUCED COLOR FADING

Takeo Okumura, Sakurashi; Shizuo Hayashi, Sugitomachi; Kanji Majima, and Kensuke Takei, both of Wakayama, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jun. 4, 1975, Ser. No. 583,789
Claims priority, application Japan, Jun. 7, 1974, 49-64629
Int. Cl.[2] C11D *1/12*
U.S. Cl. 252—550 4 Claims

1. A colored liquid detergent composition possessing improved color stability, consisting essentially of: from one to 30 percent by weight of anionic synthetic non-soap surfactant having a sulfate or sulfonate group in the molecule, from

0.0002 to 0.0005 percent by weight of a colorant of the coal-tar type approved for use in cosmetic and pharmaceutical compositions, from 0.02 to 1.0 percent by weight, based on the weight of said anionic surfactant, of butylated hydroxytoluene or butylated hydroxyanisole, and the balance is water, optionally containing conventional additives for liquid detergents.

4,077,912
CATALYSTS USEFUL FOR EXOTHERMIC REACTIONS

Serge R. Dolhyj, Parma, and Ernest C. Milberger, Solon, both of Ohio, assignors to Standard Oil Company, Cleveland, Ohio

Filed Oct. 12, 1972, Ser. No. 296,759
Int. Cl.² B01J *35/02*
U.S. Cl. 252—461 **11 Claims**

1. A catalyst comprising (a) an essentially inert, at least partially porous support of at least about 20 microns in diameter, said support having an outer surface, and (b) a coating consisting essentially of (1) a catalytically active oxide material or (2) a catalytically active oxide material and an oxide support material on said outer surface of said inert support which strongly adheres to said outer surface of said inert support.

4,077,913
CATALYST

Gary James Keith Acres, and Barry John Cooper, both of London, England, assignors to Johnson, Matthey & Co., Limited, London, England

Continuation-in-part of Ser. No. 300,980, Oct. 26, 1972, Pat. No. 3,963,827. This application Jan. 21, 1976, Ser. No. 650,866
Claims priority, application United Kingdom, Oct. 28, 1971, 50144/71; Oct. 28, 1971, 50145/71
Int. Cl.² B01J *23/10, 23/60, 23/62, 23/64*
U.S. Cl. 252—462 **17 Claims**

1. A catalyst for use in oxidation or reduction reactions comprising an inert unitary structural support having deposited thereon a mixture or alloy comprising, apart from impurities, 5 to 75 wt.% ruthenium, from a trace to 30 wt.% base metal and balance platinum in an amount not less than 5 wt.%, the base metal being selected from the group consisting of Al, Mg, Cr, Mo, W, Mn, Fe, Re, Co, Ni, Ti, V, Cu, Ag, Zn, Cd, Hg, In, Tl, Bi, Sn, Pb, Sb, the lanthanides and the actinides.

4,077,914
COMPOSITION AND METHOD FOR ELECTRIFYING A GASEOUS ATMOSPHERE

John P. Peters, Marietta, and Larry H. McAmish, East Point, both of Ga., assignors to Lester Laboratories, Inc., Atlanta, Ga.

Division of Ser. No. 433,985, Jan. 16, 1974, Pat. No. 3,924,157. This application Apr. 2, 1975, Ser. No. 564,381
Int. Cl.² H01B *1/06*
U.S. Cl. 252—518 **20 Claims**

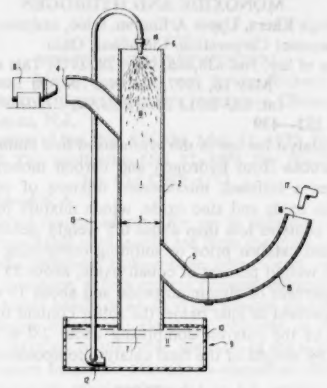
1. A water soluble composition consisting essentially of borax and a surfactant selected from the group consisting of:

a. a nonionic surfactant having an HLB number of 6.6,

b. a nonionic surfactant having an HLB number of 3.0, and

c. a liquid, nonionic, fatty acid alkylolamide,

the weight ratio of borax to surfactant being about 1.2 : 1 to about 15 : 1, wherein an aqueous solution containing about 500 – 3000 ppm of said composition is capable of increasing by at least about 40 percent the positive electrical charge in a gas stream into which said aqueous solution is sprayed.



4,077,915
NON-LINEAR RESISTOR

Masatada Yodogawa; Susumu Miyabayashi; Yoshinari Yamashita; Takashi Yamamoto; Kohji Hayashi, and Hisayoshi Ueoka, all of Tokyo, Japan, assignors to TDK Electronics Co., Ltd., Tokyo, Japan

Filed Sep. 2, 1976, Ser. No. 719,969
Claims priority, application Japan, Sep. 18, 1975, 50-112943; Oct. 3, 1975, 50-119432; Oct. 3, 1975, 50-119434; Oct. 3, 1975, 50-119435; Apr. 6, 1976, 51-38502
Int. Cl.² H01B *1/08*
U.S. Cl. 252—521 **3 Claims**

1. A non-linear resistor comprising a sintered body of a ceramic composition which consists essentially of

99.94 to 80.0 mole % of zinc oxide as ZnO, 0.02 to 10.0 mole % of the specific rare earth oxide selected from the group consisting of oxides of cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium as R_2O_3 and 0.04 to 10 mole % of manganese oxide as MnO.

4,077,916
HEXYLOXYACETONITRILE PERFUME COMPOSITIONS

Kurt Kulka, New York; Teodosij Zazula, Rego Park, both of N.Y., and John M. Yurecko, Bayonne, N.J., assignors to Fritzsche Dodge & Olcott Inc., New York, N.Y.

Continuation-in-part of Ser. No. 693,750, Jun. 8, 1976, abandoned. This application Apr. 11, 1977, Ser. No. 786,657
Int. Cl.² C11B *9/00*
U.S. Cl. 252—522 **3 Claims**

1. A perfume composition comprising .1% to 10% by weight of hexyloxyacetonitrile and at least 1% by weight of a perfume component which modifies the olfactory properties of said hexyloxyacetonitrile.

4,077,917
AQUEOUS SOLUBLE MIXED COMPLEX ORGANIC SALTS OF ALUMINUM SULFATE

George W. Panzer, Timonium, Md., assignor to Alcolac, Inc., Baltimore, Md.

Continuation-in-part of Ser. No. 365,803, May 31, 1973, Pat. No. 3,910,978. This application Sep. 8, 1975, Ser. No. 610,933
The portion of the term of this patent subsequent to Oct. 7, 1992, has been disclaimed.
Int. Cl.[2] C11D *1/12;* C07F *5/06*
U.S. Cl. 252—545 18 Claims

1. An aqueous solution of from about 10 weight % to about 60 weight % of a soluble mixed complex salt of aluminum sulfate and a neutralized organic salt selected from the group consisting of:

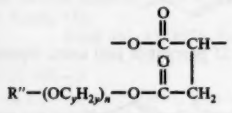
(a) an aliphatic alcohol sulfate; an alkylaryl sulfate, an alkyl, aryl or alkyaryl sulfonate; a sulfosuccinate; an N-acyl-N-alkyl taurate; and a sulfoalkyl ester of a fatty acid; which mixed complex salt has the formula:

$$[R—(OC_yH_{2y})_n—A_m—(O)_p—SO_3]_x m.I[Al_2(SO_4)_3]$$

in which R is an aliphatic radical containing 1 to 30 carbon atoms or alkylaryl hydrophobic residue having an alkyl radical containing 1 to 30 carbon atoms; n is the number of alkylene oxide groups and can be from 0 to about 100; y is a number from 2 to 4; A is a radical selected from the group consisting of

(i)

(ii)


(iii)

in which R′ is H or an alkyl group of 1 to 4 carbon atoms; R″ is an alkali metal or an alkyl group having from 8 to 22 carbon atoms; m and p are each the numbers 0 or 1, M is a cation having a valence of x, and is selected from the group of alkali metal, alkaline earth metal, manganese, zinc, copper, iron, cobalt, nickel, or nitrogen containing base radicals; x is the hydrogen equivalence value of M and can be 1 or 2; and I can be a number from about 0.001 to about 6; and

(b) a sulfated ethylene oxide-propylene oxide block polymer, which mixed salt has the formula:

$$I\ Al_2(SO_4)_3.M_x[(H)_f(SO_4)_d(C_2H_4O)_a(C_3H_6O)_b(C_2H_4O)_c(SO_3)_e(H)_g]_z.M_xI\ Al_2(SO_4)_3$$

in which b is an integer from 15 to 60; a and c are each at least 1 and $a+c$ is an integer from 4 to 300; M, x and I are as defined above; $f+d$ and $e+g$ are equal to 1; and d and e are each a number from 0.1 to 1.0.

2. The aqueous solution of claim 1, wherein said mixed salt is of aluminum sulfate and an aliphatic alcohol sulfate or an alkylaryl hydrophobe sulfate, and said soluble mixed complex salt has the formula: $[R—(OC_yCH_{2y})_n—OSO_3]_x M.I[Al_2(SO_4)_3]$ in which R represents the residue of an aliphatic alcohol or an alkylaryl hydrophobe having from 1 to 30 carbon atoms; n is a number from 1 to 100; y is a number from 2 to 4; M is a cation having a valence of x selected from the group consisting of alkali metal, alkaline earth metal, manganese, zinc, copper, iron, cobalt, nickel, and nitrogen containing base radicals, x is the hydrogen equivalence value of M and can be 1 or 2, and I is a number from 0.001 to 6.

4,077,918
PROCESS FOR THE PREPARATION OF ANION EXCHANGERS BY AMINOALKYLATION OF CROSSLINKED AROMATIC POLYMER USING SULPHUR TRIOXIDE CATALYST

Herbert Corte, Leverkusen; Harold Heller, Cologne, and Otto Netz, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 26, 1976, Ser. No. 680,099
Claims priority, application Germany, Apr. 30, 1975, 2519244
Int. Cl.[2] C08F *8/30*
U.S. Cl. 260—2.1 E 8 Claims

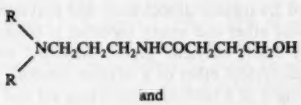
1. In the process of aminoalkylating a crosslinked, water-insoluble, organic polymer containing aromatic nuclei in the presence of a swelling agent and an alkylation catalyst, the improvement according to which sulphur trioxide is used as the catalyst and the aminoalkylating agent is a bis-dicarboximidoalkyl ether.

4,077,919
POLYURETHANE CATALYST

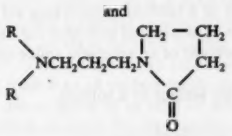
Heinz Schulze, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Oct. 28, 1975, Ser. No. 625,973
Int. Cl.[2] C08G *18/20*
U.S. Cl. 260—2.5 AC 6 Claims

1. A method for producing a polyurethane which comprises: reacting an organic polyisocyanate with an organic polyester polyol or polyether polyol in the presence of a catalytic amount of amine compound selected from the group consisting of:


(A)

and


(B)

and mixtures of (A) and (B), where R is lower alkyl.

4,077,920
FLAME- AND SMOKE-RESISTANT POLYURETHANE FOAM AND A METHOD FOR PRODUCING SAID FOAM

Toshio Yukuta, Kodaira; Takashi Ohashi, Iruma, and Katsuhiko Arai, Kodaira, all of Japan, assignors to Bridgestone Tire Company Limited, Tokyo, Japan

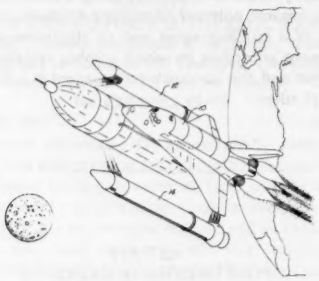
Filed May 17, 1976, Ser. No. 687,126
Claims priority, application Japan, May 15, 1975, 50-56692
Int. Cl.[2] C08G *18/32, 18/14*
U.S. Cl. 260—2.5 AM 31 Claims

1. A flame- and smoke-resistant polyurethane foam obtained by reacting a polyol, a polyisocyanate and 3–40 parts by weight, based on 100 parts by weight of the polyol, of an amine-carbamate of primary or secondary amine having alcoholic hydroxyl group in the presence of a catalyst and a surfactant.

4,077,921
SPRAYABLE LOW DENSITY ABLATOR AND APPLICATION PROCESS

Max H. Sharpe; William E. Hill; William G. Simpson; James M. Carter; Edwin L. Brown; Harry M. King; Paul H. Schuerer, all of Huntsville, and David D. Webb, Lacy Spring, all of Ala., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Jan. 19, 1977, Ser. No. 760,809
Int. Cl.[2] C08J 9/22
U.S. Cl. 260—2.5 B **10 Claims**



1. A sprayable low density ablator composition consisting essentially of:

(a) 100 parts by weight of a mixture of

25–65% by weight of phenol formaldehyde microballoons,

0–20% by weight of glass microballoons,

4–10% by weight of glass fibers,

25–45%% by weight of an epoxy-modified polyurethane resin wherein said polyurethane is produced by the reaction of 2,4-toluene diisocyanate and polytetramethylene glycol ether and epoxy modifier is bisphenol A diglycidyl ether, ethylene glycol digycidyl ether or glycerol diglycidyl ether or a mixture thereof,

2–4% by weight of a bentonite dispersing aid and

1–2% by weight of an alcohol activator for the bentonite;

(b) 1–10 parts by weight of an aromatic amine curing agent; and

(c) 200–400 parts by weight of a solvent.

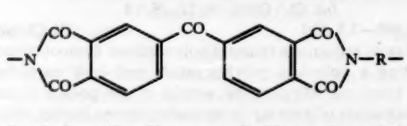
4,077,922
NOVEL COMPOSITIONS

William J. Farrissey, Jr., Northford, and Karl W. Rausch, Jr., Hamden, both of Conn., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 389,944, Aug. 20, 1973, abandoned. This application Jul. 19, 1976, Ser. No. 706,573
Int. Cl.[2] C08J 9/32
U.S. Cl. 260—2.5 N **5 Claims**

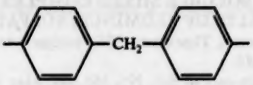
1. A syntactic foam consisting of from 70 to 85 percent by volume of hollow spherical filler particles having an average diameter within the range of 10 microns to 500 microns embedded in a polyimide selected from the class consisting of

(a) a copolyimide characterized by the recurring unit

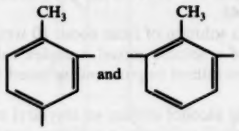


(I)

wherein from 10 to 30 percent of said recurring units are those in which R represents

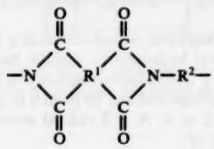


and the remainder of said units are those in which R represents a member selected from the group consisting of



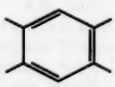
and mixtures thereof; and

(b) a copolyimide characterized by the recurring unit

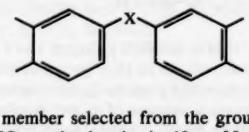


(II)

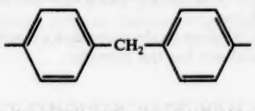
wherein, in 75 to 100 percent of said recurring units, R^1 represents



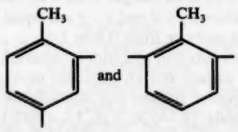
and, in the remaining 0 to 25 percent of said units, represents



where X is a member selected from the group consisting of CO, O, and SO_2; and wherein, in 10 to 35 percent of said recurring units, R^2 represents



and, in the remaining 65 to 90 percent of said units represents a member selected from the group consisting of



and mixtures thereof, said foam having been obtained by a process comprising the steps of:

admixing said hollow spherical particles with the appropriate amount of a solution containing from 15 to 25 percent by weight of said preformed polyimide in a dipolar aprotic solvent to obtain a product of putty-like consistency;

molding said putty-like material to a desired configuration

under a pressure of at least about 200 psi but less than that required to crush said hollow spherical particles;
placing said molded material on a porous sheet;
heating said molded material on said porous sheet at a temperature below the boiling point of said dipolar solvent until about 95 percent of said solvent has been evaporated; and
thereafter raising the temperature of said molded material to at least the boiling point of said dipolar solvent until the remainder of said solvent has been evaporated.

4,077,923
METHOD OF MANUFACTURING CATION EXCHANGER

Kiichi Tanaka, Kamifukuoka; Noboru Gomyo, Chofu; Kayoko Usui; Yasuyo Takahata, both of Tokyo, and Masaaki Tamayama, Hachioji, all of Japan, assignors to Nittan Company, Limited, Tokyo, Japan

Continuation of Ser. No. 482,207, Jul. 24, 1974, abandoned. This application Nov. 25, 1975, Ser. No. 635,219

Int. Cl.² C08J *11/04*

U.S. Cl. 260—2.3 **1 Claim**

1. A method of manufacturing a cation exchanger from waste tires, comprising
the steps of heat-treating comminuted tire stock at a temperature in the range of 150° to 450C to remove volatile materials,
cooling and
then sulfonating said tire particles.

4,077,924
POLYESTER FIBER-RUBBER COMPOSITES VULCANIZED WITH PHOSPHINOTHIOYL AMINO SULFIDES

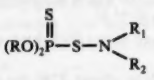
Eiichi Morita, Copley, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Filed Jul. 15, 1976, Ser. No. 705,671

Int. Cl.² C08L *9/00, 67/00*

U.S. Cl. 260—3 **26 Claims**

1. In a process for making a vulcanized composite of diene rubber and terephthalate polyester fiber, wherein the improvement comprises vulcanizing the composite with a vulcanization accelerator of the formula



in which R, R_1 and R_2 independently are alkyl of 1 to 12 carbon atoms, cycloalkyl of 5 to 8 carbon atoms, alkaryl of 7 to 10 carbon atoms, phenyl or mono- or di-lower alkyl substituted phenyl, or R_1 is hydrogen or R_1 and R_2 together with the nitrogen atom form a heterocycle in which R_1 and R_2 are joined forming an alkylene radical or oxygen interrupted alkylene radical of 4 to 8 carbon atoms.

4,077,925
HIGH TEMPERATURE HIGH FLASH POINT NON-AQUEOUS INSULATING VARNISH

Frank A. Sattler, Monroeville, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Nov. 26, 1976, Ser. No. 745,727

Int. Cl.² C09D *3/66, 5/25*

U.S. Cl. 260—22 CB **15 Claims**

1. A high temperature capability, non-aqueous, low viscosity, insulating composition comprising a 75 wt.% to 100 wt.% solids blend of:
(A) about 40 wt.% to about 90 wt.% of an alkyd component consisting essentially of the reaction product of:
(i) about 55 equivalent % to about 70 equivalent % of a polyhydric alcohol,
(ii) about 8 equivalent % to about 25 equivalent % of a fatty acid having at least one double bond and between about 12 to 18 carbon atoms per molecule,
(iii) about 15 equivalent % to about 40 equivalent % of an organic dibasic acid mixture consisting essentially of:
(a) about 40 equivalent % to about 90 equivalent % of an aromatic dibasic acid, and
(b) about 10 equivalent % to about 60 equivalent % of an unsaturated aliphatic dibasic acid, and
(B) about 10 wt.% to about 60 wt.% of an aklyl acrylate monomer having a molecular weight of over about 110 and a boiling point of over about 200° C, said composition characterized by having a flash point of over 45° C and a temperature capability of between 155° C and 220° C upon cure.

4,077,926
PRESSURE SENSITIVE ADHESIVE CONTAINING POLYMERIZED ALKOXYALKYL ESTER OF UNSATURATED CARBOXYLIC ACID

Frank Thomas Sanderson, Huntingdon Valley; Alexander Kowalski, Collegeville, both of Pa., and Roger H. Kottke, Redwood Falls, Minn., assignors to Rohm and Haas Company, Philadelphia, Pa.

Continuation-in-part of Ser. No. 355,128, Apr. 27, 1973, abandoned, which is a continuation of Ser. No. 89,028, Nov. 12, 1970, abandoned. This application Apr. 24, 1974, Ser. No. 463,483

Int. Cl.² C08F *220/28, 222/10;* **C09J** *7/02*

U.S. Cl. 260—29.6 TA **11 Claims**

1. A water-insoluble pressure sensitive adhesive in the form of a dry film, an organic solvent solution, an aqueous dispersion, or a nonaqueous dispersion, containing a polymer, a dry film of which is tacky, the polymer containing, in parts by weight, of about 5% to 99.5% of an alkoxyalkyl ester of an α,β-unsaturated acid, the alkoxyalkyl group having the structure $-(-R_1-O-)_n-R_2$ wherein R_1 is alkylene having 1 to 4 carbon atoms and R_2 is alkyl having 1 to 4 carbon atoms, n being from 1 to 4, about 0.25% to 20% of an α,β-unsaturated acid, selected from the group consisting of itaconic acid and α,β-unsaturated monocarboxylic acids, about 0.5% to 20% of an hydroxyalkyl ester of an α,β-unsaturated carboxylic acid having at least one hydroxyl functionality, and 0% to 94.5% of at least one of an alkyl acrylate having from 2 to 12 carbon atoms in the alkyl group and an alkyl methacrylate having an average of from 6 to 14 carbon atoms in the alkyl group, and optionally one or more of an ester of acrylic acid having 1 or 13 to 20 carbon atoms in the alkyl group and an ester of methacrylic acid having 1 to 4 or 15 to 20 carbon atoms in the alkyl group, said polymer having a Tg of below about −15° C., the total parts being 100.

4,077,927
CURED EPOXY POLYMER HAVING IMPROVED ADHESIVE PROPERTIES

Charles Allen McPherson, Easthampton Township, Burlington County, N.J., assignor to Western Electric Company, Incorporated, New York, N.Y.

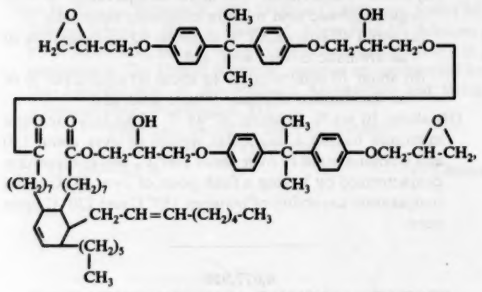
Division of Ser. No. 465,376, May 1, 1974, which is a continuation-in-part of Ser. No. 443,648, Feb. 19, 1974, abandoned, which is a continuation-in-part of Ser. No. 369,038, Jun. 11, 1973, abandoned. This application Dec. 19, 1975, Ser. No. 642,221

Int. Cl.² C08L *63/00*

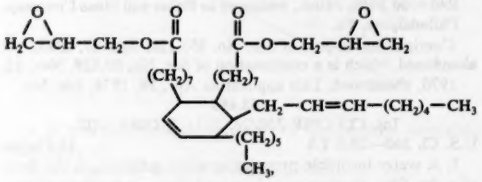
U.S. Cl. 260—23.7 N **12 Claims**

1. A cured epoxy polymer having improved adhesive properties comprising the reaction product of a mixture comprising:
(1) a resin component comprising,
(a) about 25 to about 95 parts by weight per 100 parts by weight of said resin component of a diglycidyl ether based upon linoleic dimer acid selected from the group consisting of (a^1) an adduct of two moles of the diglyci-

dyl ether of bisphenol A and one mole of linoleic dimer acid having a structural formula of

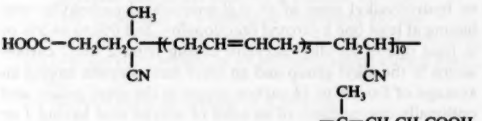


and an epoxide equivalent weight of 650 to 750, (b^1) a diglycidyl ether of linoleic dimer acid having a structural formula of



and an epoxide equivalent weight of 400 to 420, and (c^1) a mixture thereof,

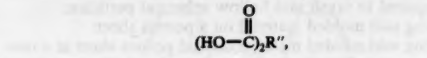
(b) about 5 to about 50 parts by weight per 100 parts by weight of the resin component of an elastomerically modified epoxy resin blend comprising the reaction product of about 40 weight percent of a carboxyl terminated acrylonitrile/butadiene random copolymer having a structural formula of



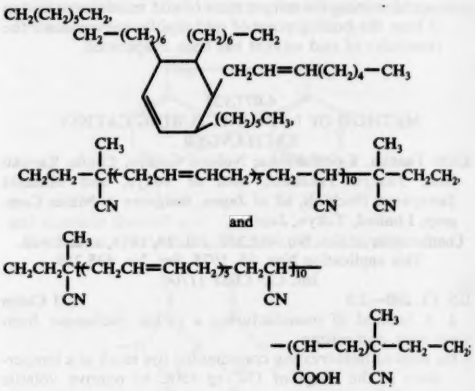
containing 2.37 percent carboxyl groups, 18 to 19 percent bound acrylontrile and having a number average molecular weight of 3200, combined with about 60 weight percent of a diglycidyl ether selected from the group consisting of a diglycidyl ether of bisphenol A having an epoxide equivalent weight of 180 to 195 and a diglycidyl ether of bisphenol F having an epoxide equivalent weight of 152 to 167; and

(c) a remainder of a suitable diglycidyl ether selected from the group consisting of a diglycidyl ether of bisphenol A, a diglycidyl ether of bisphenol F or a mixture thereof; and

(2) a suitable curing agent selected from (a) an acid anhydride present in an amount ranging from about 16 to about 60 parts by weight per 100 parts by weight of the resin component, (b) a suitable polyamine present in an equal mole-to-mole ratio with the resin component, (c) a mixture comprising said polyamine in (b) above combined with at least 5 parts by weight per 100 parts by weight of the resin component of a suitable acid anhydride, (d) a mixture comprising said acid anhydride in (a) above combined with up to about 30 parts by weight per 100 parts by weight of the resin component of a carboxylic acid selected from the group consisting of dicarboxylic acid having a structural formula of



where R'' is an organic radical selected from



and

a trimer acid having a stoichiometry of $C_{54}H_{96}O_6$, and a mixture thereof, and (e) a mixture of the foregoing.

4,077,928

ASPHALT BASED COMPOSITIONS

Russell E. Koons, El Dorado, Ark., assignor to Lion Oil Company, El Dorado, Ark.

Continuation-in-part of Ser. No. 532,685, Dec. 13, 1974, abandoned. This application Nov. 11, 1975, Ser. No. 630,768

Int. Cl.[2] C08L 95/00

U.S. Cl. 260—28.5 AS **7 Claims**

1. A coating composition for use in coating pipes which will withstand low temperature climatic conditions said composition consisting essentially of:

a. from about 49% to about 73% by weight of a solvent extracted hard asphalt having a penetration at 77° F. of from 0 to 10 mm/10 and a softening point of from about 165° F. to about 215° F.,

b. from about 10% to about 29% by weight of a fine mineral filler,

c. from about 17% to about 32% by weight of a polyurethane elastomer formed in situ in the presence of said asphalt by the reaction of a liquid hydroxyl-terminated polybutadiene resin having a molecular weight of about 400 to 10,000 and a polyphenylmethylene polyisocyanate, the weight ratio of said polybutadiene resin and polyisocyanate being sufficient to form a polyurethane elastomer when said polybutadiene is reacted with said polyisocyanate, and

d. from about 0.3% to about 2% by weight of a tertiary amine catalyst which is stable and nonvolatile at a temperature of from about 300° F. to 350° F.

6. A pipe coated at least partially with a coating composition which will withstand low temperature climatic conditions, said pipe composition consisting essentially of from about 49% to 73% by weight of at least one solvent extracted hard asphalt having a penetration at 77° F. of about 0 to about 10 mm/10 and a softening point of about 165° F. to about 215° F., from about 10% to 29% by weight of a fine mineral filler, a catalytic effective amount of a tertiary amine catalyst which is stable and nonvolatile at a temperature of from about 300° F. to 350° F., and from about 17% to 32% of at least one urethane polymer formed in situ in the presence of said asphalt by the reaction of at least one intermediate polyhydroxy polymer having an average of at least about 1.8 predominantly primary, terminal, allylic hydroxyl group per molecule and being an addition

polymer of about 0 to about 75% by weight of an alpha-olefinic monomer of 2 to about 12 carbon atoms, and about 25% to 100% of a 1, 3-diene hydrocarbon of 4 to about 12 carbon atoms, said intermediate polymer having a viscosity at 30° C. of about 15 to about 5,000 poises, the majority of its unsaturation in the main carbon chain, and a number average molecular weight of about 400 to about 10,000 with at least one polyisocyanate, the weight ratio of said intermediate polyhydroxy polymer to polyisocyanate being sufficient to form a urethane polymer when said intermediate polyhydroxy polymer is reacted with said polyisocyanate.

4,077,929
PROCESS FOR PRODUCING FLAME-RESISTANT FILAMENTS

Larry Grant Robinson, Camden, S.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 6, 1975, Ser. No. 555,995
Int. Cl.² C08L *35/04*
U.S. Cl. 260—29.6 AQ **14 Claims**

1. In the process of producing flame-resistant filaments by preparing a hot solution of a halogen-containing acrylonitrile polymer composition in an inert organic solvent for the composition, extruding the solution to form filaments and removing the solvent from the filaments; the improvement for reducing corrosive effects of the solution on metallic equipment, as determined at a temperature of 120° C., which comprises incorporating water and a phosphorus compound in the solution, where the phosphorus compound is selected from phosphoric acid, phosphorous acid, and triorgano phosphite compounds consisting of carbon, hydrogen, oxygen and phosphorus, the amount of water being 1 to 10 percent by weight based on the weight of inert organic solvent plus water and the amount of phosphorus compound being 0.005 to 0.1 mole per kilogram of polymer in the composition.

4,077,930
SELF-INVERTING EMULSIONS OF DIALKYLDIALLYL AMMONIUM CHLORIDE POLYMERS AND COPOLYMERS

Sim Koei Lim, Stamford, Conn.; Arnold Eugene Bloomquist, Crystal Lake, Ill., and Raymond Joseph Schaper, Pittsburgh, Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Continuation of Ser. No. 487,931, Jul. 16, 1974, abandoned, which is a continuation-in-part of Ser. No. 402,570, Oct. 1, 1973, abandoned. This application Feb. 24, 1976, Ser. No. 660,886
Int. Cl.² C08L *33/02*; D21H *3/38*; C08L *33/14, 33/24*
U.S. Cl. 260—29.6 TA **5 Claims**

1. A stable, self-inverting water-in-oil dimethyl diallyl ammonium chloride polymer-containing emulsion prepared by a process which comprises polymerizing the corresponding monomer or monomers at a temperature at from about 0° to about 100° C. with agitation in the presence of water, an inert hydrophobic liquid and a free radical catalyst, and also in the presence of at least 20 percent by weight, based on the weight of the oil phase, of an emulsifier having an HLB of at least 7, and continuing the polymerization until the reaction is substantially complete.

4,077,931
THERMOSET WATER-IN-OIL EMULSIONS

Robert H. Leitheiser, Port Washington, Wis., and Casimir C. Peloza, Columbus, Ohio, assignors to Ashland Oil, Inc., Dublin, Ohio

Continuation of Ser. No. 323,267, Jan. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 96,986, Dec. 10, 1970, abandoned, and Ser. No. 762,320, Sept. 16, 1968, abandoned. This application Jul. 31, 1975, Ser. No. 600,558
Int. Cl.² C08L *67/06*
U.S. Cl. 260—29.6 NR **33 Claims**

1. A method for producing shapeable water-in-resin composition which is polymerizable to a thermoset cellular solid product which comprises forming a pumpable water-in-oil emulsion, comprising water emulsified in an oil phase, by agitating: water; peroxide catalyst; cobalt salt promoter; tertiary aromatic amine promoter; said cobalt salt promoter and tertiary aromatic amine promoter being present in the oil phase in an amount in the range of about 0.1 to 5% by weight of the oil phase; unsaturated polyester which has a mean molecular weight in the range of 1800 to 100,000, said polyester including reaction product of polycarboxylic acid, at least a portion of which is α,β ethylenically unsaturated, and polyhydric alcohol; and ethylenically unsaturated solvent which is copolymerizeable with said polyester; the weight ratio of polyester and solvent to water being in the range of 1:10 to 10:1; and the weight ratio of polyester to solvent being in the range of 10:1 to 1:10.

4,077,932
ACRYLATE ADHESIVE AQUEOUS DISPERSIONS

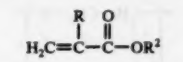
Peter Spiros Columbus, Whitestone, N.Y., assignor to Borden, Inc., Columbus, Ohio

Division of Ser. No. 453,245, Mar. 21, 1974, abandoned. This application Jan. 29, 1976, Ser. No. 653,437
Int. Cl.² C08L *33/08*
U.S. Cl. 260—29.6 TA **3 Claims**

1. An aqueous adhesive composition having pH of about 8 to 10 containing from about 25 to 75% by weight of water, the water having dispersed therein:

A. from about 25 to 75% by weight of the composition, of a water-insoluble linear polymer of interpolymerized monoethylenically unsaturated monomers in amounts by weight based on the linear polymer:

(1) from about 50 to 99% of an acrylic ester monomer of the formula



or a mixture thereof, where R is H or methyl and R^2 is lower alkyl of 1 to 4 carbon atoms,

(2) from about 0.1 to 10% of acrylic acid or methacrylic acid,

(3) from about 0.1 to about 10% of a nitrogen containing monomer selected from the group consisting of vinyl amines and salts thereof, and vinyl ureido monomers, vinyl compounds having heterocyclic nitrogen containing groups, and

B. 0.001 to 2% of a silane containing both alkoxy and epoxy functionalities.

4,077,933
PROCESS FOR PREPARING A SULFONATED AND PASSIVATED LOW UNSATURATION ELASTOMER CEMENT

Gilbert W. Burton, Mountainside, and Charles P. O'Farrell, Clark, both of N.J., assignors to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 592,461, Jul. 2, 1975, Pat. No. 4,007,149. This application Oct. 4, 1976, Ser. No. 729,415
Int. Cl.² C08L *9/10*
U.S. Cl. 260—29.7 EM **13 Claims**

1. Process for preparing a sulfonated and passivated low unsaturation elastomer cement, the elastomer being butyl rubber or EPDM, which comprises the steps of (a) providing a cement of the elastomer and a volatile solvent; (b) sulfonating the elastomer cement with an acyl sulfonating agent; and (c) passivating the sulfonated cement with at least a stoichiometric amount of an organic epoxide containing at least one reactive oxirane group.

4,077,934
METHOD OF PREPARING COMPOSITIONS THAT COMPRISE A POLYPHENYLENE ETHER RESIN AND AN ALKENYL AROMATIC RESIN

Gim Fun Lee, Jr., Albany, N.Y., assignor to General Electric Company, Pittsfield, Mass.

Filed Dec. 31, 1975, Ser. No. 645,531
Int. Cl.[2] C08K 5/52
U.S. Cl. 260—30.6 R 16 Claims

1. A method of preparing a thermoplastic composition which comprises:

(a) a polyphenylene ether resin; and

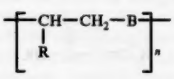
(b) an alkenyl aromatic resin; said method comprising first combining the polyphenylene ether resin with a phosphate compound that reduces the alloying temperature of the polyphenylene ether resin to form a preblend and thereafter combining said preblend with the alkenyl aromatic resin to form the thermoplastic composition.

4,077,935
PLASTISOL COMPOSITION COMPRISING (A) COPOLYMER OF OLEFIN AND MALEIC ACID, AND (B) POLYESTER PLASTICIZER

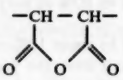
Walter R. Wszolek, Sykesville, Md., assignor to W. R. Grace & Co., New York, N.Y.

Division of Ser. No. 563,018, Mar. 28, 1975, Pat. No. 4,020,966. This application Jan. 5, 1977, Ser. No. 756,934
Int. Cl.[2] C08L 91/00; C08K 5/09, 5/10
U.S. Cl. 260—31.8 R 4 Claims

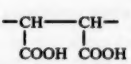
1. A plastisol composition comprising (a) a copolymer resin of a normal α-olefin and maleic anhydride (1:1 mole ratio) having a particle size in the range from about 0.1 to about 1500 microns and having the structure



wherein B is a member of the group consisting of



and



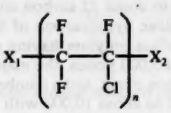
R is H or C_xH_{2x+1}, x is 1 to 16 and n is 2–300, and (b) 65–600 parts/100 parts copolymer of a polyester plasticizer.

4,077,936
LIQUID SUSPENDING MEDIUM FOR ELECTROPHORETIC IMAGE DISPLAY/AND OR RECORDING DEVICE

Shigeru Tanaka, Neyagawa, and Joichi Ohnishi, Toyonaka, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 9, 1975, Ser. No. 611,602
Claims priority, application Japan, Sep. 12, 1974, 49-105692; Sep. 12, 1974, 49-105693; Sep. 19, 1974, 49-108534
Int. Cl.[2] C08K 5/02; C09D 11/02
U.S. Cl. 260—33.8 R 13 Claims

1. A liquid suspending medium for an electrophoretic image display and/or recording device, comprising as a main component an oligomer of 1,1,2-trifluoro-2-chloroethylene expressed by



where n is 2 or 3, and each of X_1 and X_2 is one member selected from the group consisting of Cl and F, and further comprising electrophoretic particles suspended therein in an amount sufficient to provide an electrophoretic effect, wherein each of said electrophoretic particles comprises titanium dioxide.

4,077,937
CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Yasuhiko Sato, and Toshio Shiobara, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Nov. 18, 1976, Ser. No. 743,068
Claims priority, application Japan, Nov. 27, 1975, 50-141737
Int. Cl.[2] C08L 83/04
U.S. Cl. 260—37 SB 12 Claims

12. A curable organopolysiloxane molding composition comprising

(a) an organopolysiloxane having in a molecule at least two vinyl groups bonded directly to the silicon atoms and expressed by the average unit formula

$$(R^1)_aSiO_{4-a/2}$$

where R^1 is a group selected from the class consisting of methyl, vinyl and phenyl groups and a is a positive number in the range of from 1.0 to 1.8 inclusive,

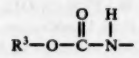
(b) an organohydrogenpolysiloxane having in a molecule at least two hydrogen atoms bonded directly to the silicon atoms and expressed by the average unit formula

$$(R^2)_b(H)_cSiO_{4-b-c/2}$$

where R^2 is a group selected from the class consisting of methyl, phenyl and β-phenylpropyl groups, b is a positive number in the range of from 0.5 to 2.09 inclusive and c is a positive number in the range of from 0.01 to 1.2 inclusive, with the proviso that $b+c$ is between 1.0 and 3.0 inclusive, the amount of the organohydrogenpolysiloxane being such that from 0.6 to 2.5 hydrogen atoms bonded directly to the silicon atoms are provided per vinyl group in component (*a*).

(c) platinum or a platinum compound in a catalytic amount, and

(d) an organic compound having in a molecule at least one monovalent group represented by the general formula



where R^3 is a monovalent hydrocarbon group having at least one acetylenic triple bond, the amount of the organic compound being such that at least two acetylenic triple bonds are provided per platinum atom in component (*c*),

(e) an inorganic filler in an amount of 100 to 500% by weight based on the combined weight of components (*a*) and (*b*), and

(f) a lubricant.

4,077,938

SOL OF ULTRA-FINE PARTICLES OF LAYERED STRUCTURE MATERIAL

Nobutoshi Daimon, Nagano; Toichiro Izawa, Matsudo, both of Japan, and Motoyuki Imai, 7-7-905, Hiroo 1-chome, Shibuya, Tokyo, Japan, assignors to Motoyuki Imai, Tokyo, Japan

Filed Feb. 13, 1976, Ser. No. 658,013
Int. Cl.² C08L *83/04*
U.S. Cl. 260—37 SB **3 Claims**

1. A dispersion of ultra-fine particles of a layered structure material selected from the group consisting of montmorillonite, hectorite, tetra-silicic mica and taeniolite in an organic liquid, prepared by (a) cleaving the layered structure material into ultra-fine particles in an aqueous medium; (b) ion-exchanging hydratable ions of the ultra-fine particles with non-hydratable ions; (c) hydrophobing the ion-exchanged ultra-fine particles with an organic material selected from the group consisting of a titanic acid ester; a zirconic acid ester; silanes having one of methoxy-, ethoxy- and silanol-radicals and one of vinyl-, epoxy-, acryl- and amino-radicals; β-diketones mixed with lauryl amine; titanium amide; zirconium amide; and cationized silicone oil; (d) removing the aqueous medium; and (e) dispersing the hydrophobed particles in an organic liquid.

4,077,939

MOULDING COMPOSITIONS INCLUDING AN UNSATURATED POLYESTER

Piero Paparatto, Milan; Silvio Vargiu, Casatenovo (Como); Antonio Parodi, and Beppino Passalenti, both of Milan, all of Italy, assignors to Societa' Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Oct. 22, 1976, Ser. No. 734,816
Claims priority, application Italy, Oct. 30, 1975, 28804 A/75
Int. Cl.² C08G *63/18*; C08K *3/40*
U.S. Cl. 260—40 R **15 Claims**

1. A granular molding composition suitable for injection molding comprising:

(a) from 10 to 50% by weight of an unsaturated polyester consisting of the polycondensation product of a polyol substance selected from the group consisting of alkylene glycols and mixtures of the latter with up to 20 wt.% of 2,2'-bis(4-hydroxycyclohexyl)propane in its unsubstituted or halogenated form, with an ethylenically unsaturated dicarboxylic acid and a saturated dicarboxylic acid, said polycondensation product having the following characteristics:

melting point (at the capillary) $\geqq 60°$ C

acid value (mg.KOH/g) < 50

Gardner viscosity (at 25° C in 60 wt.% solution in styrene) from U to Z_2;

(b) from 0.2 to 2 wt.% of an organic peroxide having a decomposition temperature above 70° C;

(c) one or more inert fillers.

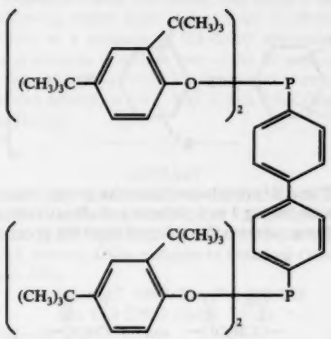
4,077,940

THERMAL STABILIZATION OF POLYPYRROLIDONE AGAINST REVERSION TO MONOMER

Carroll J. Wedel, Walnut Creek, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Sep. 14, 1976, Ser. No. 723,114
Int. Cl.² C07F *9/48*; C08K *5/53*
U.S. Cl. 260—45.7 P **3 Claims**

1. A composition of matter comprising a major amount of a normally solid poly-2-pyrrolidone and a thermal stabilizing amount, effective to reduce the thermal degradation of said poly-2-pyrrolidone to monomer, of an additive having the formula



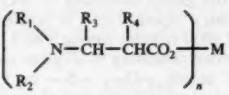
4,077,941

METAL SALTS OF N,N-DISUBSTITUTED β-ALANINES AND STABILIZED COMPOSITIONS

John F. Stephen, New City, and John D. Spivack, Spring Valley, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 449,881, Mar. 11, 1974, abandoned. This application Apr. 21, 1976, Ser. No. 679,255
Int. Cl.² C08K *5/09*
U.S. Cl. 260—45.75 N **19 Claims**

1. A compound of the formula



I

wherein

R_1 and R_2 independently of each other are alkyl, phenyl, phenyl substituted with 1 or 2 alkyl groups, cycloalkyl having 5 to 6 carbon atoms, benzyl or benzyl substituted with an alkyl group on the phenyl nucleus;

R_3 and R_4 are both independently hydrogen and lower alkyl;

M is a member selected from the group consisting of nickel, iron, chromium, manganese, zinc aluminum, tin, dialkyl tin and titanium; and

n has a value of from 1 to 4, the value of n being the same as the available valence of M.

17. A composition of matter stabilized against ultraviolet deterioration which comprises a synthetic organic polymer normally subject to ultraviolet deterioration containing from

(a) 0.005% to 5% of a stabilizing compound according to claim 1,

(b) 0 to 5% of a phenolic antioxidant,

(c) 0 to 5% of a thio co-stabilizer, and

(d) 0 to 5% of a UV absorber.

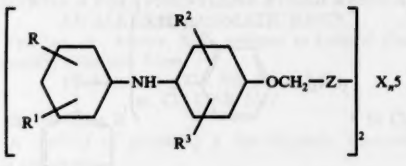
4,077,942

BIS(4-ANILINOPHENOXY) ESTER ANTIOXIDANTS

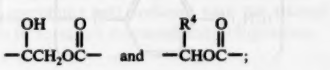
Richard H. Kline, Cuyahoga Falls, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Dec. 17, 1976, Ser. No. 751,494
Int. Cl.² C08K *5/36*
U.S. Cl. 260—45.85 S **15 Claims**

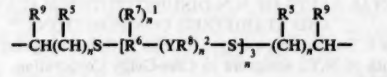
1. A compound having the following structural formula:



wherein R and R^1 are selected from the group consisting of H, alkyl radicals having 1 to 4 carbons and alkoxy radicals having 1 to 4 carbons; wherein Z is selected from the group consisting of



wherein R^2, R^3, and R^4 are selected from the group consisting of H and alkyl radicals having from 1 to 4 carbons (1–4C); wherein X is selected from the group consisting of alkylene radicals (1–22C), 1,4phenylene, and



wherein R^5 and R^9 are selected from the group consisting of H and alkyl radicals (1–4C); wherein R^6 is selected from the group consisting of alkylene radicals having 1 to 6 carbons, cycloalkylene radicals having 5 to 12 carbons and $-R^{11}-R^{10}-(R^{12})_n4-$; wherein R^{10} is selected from the group consisting of cycloalkylene radicals having 5 to 12 carbons and R^{11} and R^{12} are selected from the group consisting of alkylene radicals having 1 to 6 carbons, n^4 equals 0 or 1; R^7 is selected from the group consisting of alkyl radicals having 1 to 4 carbons; R^8 is selected from the group consisting of alkylene radicals having 1 to 6 carbons; Y equals —O—, —S— or 1,4-phenylene; wherein n, n^2, n^3 and n^5 equal 0 or 1 and n^1 equals 0 to 4.

8. A diene polymer susceptible to oxidative degradation having incorporated therein a compound according to claim 1.

4,077,943

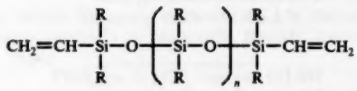
CURABLE ORGANOPOLYSILOXANE COMPOSITIONS

Yasuhiko Sato, and Hiroshi Inomata, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Sep. 21, 1976, Ser. No. 725,280
Claims priority, application Japan, Sep. 26, 1975, 50/116795
Int. Cl.² C08G *77/04*
U.S. Cl. 260—46.5 UA **17 Claims**

1. A curable organopolysiloxane composition comprising

(a) a diorganopolysiloxane having a viscosity in the range from 10 to 1,000,000 centistokes at 25° C, terminated at both chain ends with vinyl groups directly bonded to the terminal silicon atoms and expressed by the general formula



where R is a monovalent hydrocarbon group having no aliphatic unsaturation and n is a positive integer,

(b) an organohydrogenpolysiloxane or a mixture of organohydrogenpolysiloxanes having at least two hydrogen bonded directly to the silicon atoms in a molecule, at least 1% by weight of said organohydrogenpolysiloxane or organohydrogenpolysiloxanes having at least one epoxy group or ester group in a molecule, in an amount sufficient to provide from 0.5 to 4.0 hydrogen atoms bonded directly to the silicon atoms per vinyl group in component (a), and (c) platinum or a platinum compound in a catalytic amount.

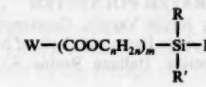
4,077,944

CATALYTIC PRODUCTION OF POLYESTERS

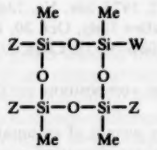
Kurt Weinberg, Upper Saddle River, N.J., and Gordon Carlton Johnson, Armonk, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Filed Feb. 28, 1977, Ser. No. 773,000
Int. Cl.² C08G *63/38*
U.S. Cl. 260—75 R **8 Claims**

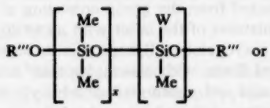
1. In a process for the manufacture of solid fiber-forming polyesters and copolyesters of dicarboxylic acid compounds and aliphatic glycols in the presence of catalysts, the improvement of using as polycondensation catalyst a silicon compound selected from the group consisting of:



(I)



(II)

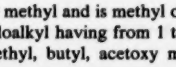


(III)

(IV) $QCH_2CH_2SiR_3$**

wherein

W is $CH_2{=}CX-$ or



X is hydrogen or methyl and is methyl only when m is one;

R* is alkyl or haloalkyl having from 1 to 4 carbon atoms;

R** is methyl, ethyl, butyl, acetoxy methoxy, ethoxy or butoxy;

R is methyl, ethyl, butyl or trimethylsiloxy;

R′ is methyl, methoxy, ethoxy, butoxy or trimethylsiloxy;

R″ is methoxy, ethoxy, butoxy, trimethylsiloxy or vinyldimethylsiloxy;

R‴ is methyl, ethyl, butyl or trimethylsilyl; Me is methyl;

Z is methyl or W;

Q is an NH_2CH_2-, $NH_2CH_2CH_2NHCH_2-$, NC—, HS— or $HSCH_2CH_2S-$ group;

n is an integer having a value of from 2 to 5;

m is an integer having a value of zero or one;

x is an integer having a value of from 1 to 100; and

y is an integer having a value of from 1 to 100.

4,077,945

PROCESS FOR MAKING LINEAR POLYESTERS FROM ETHYLENE GLYCOL AND TEREPHTHALIC ACID

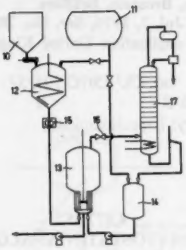
Helmut Heinze, Frankfurt am Main, and Eberhard Häckel, Hochstadt, both of Germany, assignors to Zimmer Aktiengesellschaft, Germany

Continuation of Ser. No. 559,027, Mar. 17, 1975, abandoned. This application Apr. 18, 1977, Ser. No. 788,291

Claims priority, application Germany, Mar. 23, 1974, 2414122

Int. Cl.[2] C08G *63/22*; C07C *69/76*

U.S. Cl. 260—75 M **6 Claims**



1. A process for making linear polyesters by discontinuous direct esterification of ethylene glycol and terephthalic acid at molar ratios of 1.1:1 to 2.0:1, in which at the beginning of the esterification reaction heated glycol is placed in the reaction vessel and the terephthalic acid is fed into the glycol, followed by polycondensation of the esterification product, the improvement comprising:

maintaining 0.1 to 1.4 moles of the glycol required for the esterification reaction per mole of the terephthalic acid at a temperature above 200° C at superatmospheric pressure in the said reaction vessel and in the substantial absence of terephthalic acid,

preparing a terephthalic acid paste containing 1.9 to 0.6 moles of ethylene glycol per mole of terephthalic acid,

initiating esterification by feeding said paste to said heated glycol in the reaction vessel over a period of time and under agitation,

esterifying the resulting mixture at a temperature of between 200° to 290° C and a pressure of between 1 and 15 atmospheres, and

lowering the pressure as the reaction proceeds.

4,077,946

CONTINUOUS PROCESS OF PRODUCING POLYLAUROLACTAM

Gennady Abovich Enenshtein, ulitsa Chernyshevskogo 25, kv.9; Alexandr Vladimirovich Berezovsky, ulitsa Plekhanova, 24, korpus, 1, kv. 48; Marina Konstantinovna Dobrokhotova, Dubininskaya ulitsa, 6, kv. 93; Evgenia Konstantinovna Lyadysheva, Shosse Entuziastov, 188/2, kv. 13; Larisa Alexeevna Nosova, Altaiskaya ulitsa, 24, kv. 44; Siyar Nurgalievich Nurmukhomedov, ulitsa Stalevarov, 4, korpus 3, kv. 279; Evgenia Lvovna Tarasova, prospekt Kalinina, 31, kv. 65, all of Moscow; Sergei Sergeevich Gusakov, ulitsa Zavodskaya, 1a, kv. 1, Pavlovo-Posad Moskovskoi Oblasti; Lazar Davydovich Pertsov, ulitsa Zelendolskaya, 12, kv. 119, Moscow, and Igor Alexandrovich Ebel, ulitsa Moskovskaya, 1, kv. 153, Ljubertsy Moskovskoi oblasti, all of U.S.S.R.

Filed Jan. 15, 1976, Ser. No. 649,515

Int. Cl.[2] C08G *69/16*

U.S. Cl. 260—78 L **3 Claims**

1. A continuous process for producing polylaurolactam, which is solid at room temperature comprising hydrolytically polymerizing a moving stream of a laurolactam melt containing an activating amount of water, a catalytically effective amount of orthophosphoric acid and a molecular weight regulating amount of a dicarboxylic acid in a homophase system at a temperature of 280°–310° C under a pressure of 70–120 atmospheres with the formation of an initial reaction mixture containing a prepolymerizate and water and being a homophase system, removing water from said mixture by throttling the mixture down to a pressure of 0.1–0.005 atmosphere under isothermal conditions at a flow rate of 20–90 meters per second; and subsequently completing the polymerization of the throttled down mixture at 280°–300° C in a 0.5–2.0 millimeters thick layer thereof.

4,077,947

TERPOLYMERS COMPRISING OLEFINIC NITRILES, N-VINYLIMIDES AND INDENE OR COUMARONE AND PROCESS FOR PREPARING THE COMPOSITIONS

George S. Li, Aurora, Ohio, assignor to Standard Oil Company, Cleveland, Ohio

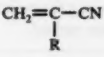
Filed Jan. 17, 1977, Ser. No. 759,813

Int. Cl.[2] C08G *69/00, 73/10*

U.S. Cl. 260—78 UA **9 Claims**

1. The terpolymer composition resulting from the copolymerization in the presence of a free-radical initiator of

A. from about 30 to 90% by weight of at least one nitrile having the structure



wherein R is hydrogen, a lower alkyl group having from 1 to 4 carbon atoms, or a halogen,

B. from about 5 to 55% by weight of an N-vinyl imide selected from the group consisting of N-vinyl succinimide, N-vinyl glutarimide, and N-vinyl phthalimide, and

C. from about 1 to 25% by weight of at least one member selected from the group consisting of indene and coumarone

wherein the given percentages of (A), (B) and (C) are based on the combined weight of (A), (B) and (C).

4,077,948

METAL DEACTIVATORS AS ADHESION PROMOTORS FOR VULCANIZABLE ELASTOMERS TO METALS

George K. Cowell, Loveland, Ohio, and David J. Cherry, Somers, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 600,240, Jul. 30, 1975, Pat. No. 3,994,987, which is a division of Ser. No. 404,972, Oct. 10, 1973, Pat. No. 3,907,925. This application Apr. 7, 1976, Ser. No. 674,479

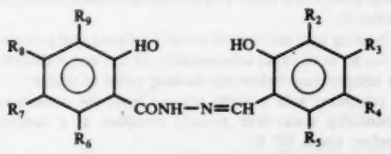
The portion of the term of this patent subsequent to Sep. 23, 1992, has been disclaimed.

Int. Cl.[2] B29H *5/02*

U.S. Cl. 260—79.5 R **6 Claims**

1. A method of improving adhesion between a vulcanizable elastomeric composition and a metal surface to provide a strong and durable bond, which method comprises

(a) adding to a vulcanizable elastomeric composition a methylene acceptor and a methylene donor reactable therewith, and from 0.05 percent to 10 percent by weight based on the weight of the elastomer of a metal deactivating compound of the formula



wherein R_2, R_3, R_4, R_5, R_6, R_7, R_8, and R_9 are each independently hydrogen, lower alkyl, lower alkoxy, or a phenyl group, and

(b) vulcanizing the composition while it is in contact with the metal surface.

4,077,949

POLYPEPTIDE HORMONES OF THE THYMUS

Gideon Goldstein, Short Hills, N.J., assignor to Sloan-Kettering Institute for Cancer Research, New York, N.Y.

Continuation-in-part of Ser. No. 429,202, Dec. 28, 1973, abandoned. This application Aug. 22, 1975, Ser. No. 606,843

Int. Cl.[2] C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 R **8 Claims**

1. A highly purified polypeptide named as Thymopoietin I and having the following amino acid sequence:

H_2N-GLY-GLN-PHE-LEU-GLU-ASP-PRO-SER-VAL-
LEU-THR-LYS-GLU- LYS-LEU-LYS-SER-GLU-
LEU-VAL-ALA-ASN-ASN-VAL-THR-LEU-PRO-
ALA-GLY-GLU- GLN-ARG-LYS-ASP-VAL-TYR-
VAL-GLN-LEU-TYR-LEU-GLN-HIS-LEU-THR-
ALA-VAL- LYS-ARG-COOH,

said polypeptide existing in the physical form of a powder, said polypeptide having relative mobilities on 7% polyacrylamide disc electrophoresis of 0.3 at a pH of 8.9 with respect to bromophenol blue, and 0.63 at a pH of 4.3 with respect to methyl green, said polypeptide being therapeutically active at concentrations of 0.2-2 nanogram per ml.

4,077,950

PROCESS FOR THE RECOVERY OF SUBSTANTIALLY WATER-SOLUBLE NON-TOXIC PROTEIN COMPOUNDS FROM FRESH NON-WOODY VEGETATION

Robert Wickey White, New York, N.Y., assignor to Source Proteins, Inc., Ossining, N.Y.

Filed Jul. 12, 1976, Ser. No. 704,118

Int. Cl.[2] A23J *1/14*

U.S. Cl. 260—112 R **1 Claim**

1. A process for treating alfalfa to recover a substantially water-soluble, non-toxic protein product, comprising the steps of:

(a) contacting said alfalfa with an aqueous alkaline medium containing sodium bisulfite in an amount sufficient to increase the moisture content thereof to at least about 80% by weight and to increase the pH thereof to at least about 8.0;

(b) mechanically comminuting the moisturized and alkalinized alfalfa in a manner which prevents said alfalfa from reaching a temperature above about 50° C;

(c) mechanically expressing said comminuted alfalfa in a manner which prevents said alfalfa from reaching a temperature above about 50° C, to obtain an aqueous protein-containing fraction therefrom;

(d) acidulating said protein-containing fraction to a pH of from about 2.5 to about 5 to precipitate a water-containing protein-lipid complex;

(e) mechanically removing from about 60 to about 70% of the water from said water-containing protein-lipid complex at ambient temperature;

(f) contacting said protein-lipid complex with a non-polar, water immiscible volatile organic solvent to extract from said precipitate lipids and other compounds soluble in said solvent;

(g) heating said mixture of volatile solvent and protein complex so as to expel substantially all the water therefrom at a temperature below the boiling point of water;

(h) removing said volatile solvent from the remaining substantially water-free protein complex at a temperature below about 80° C;

(i) countercurrently extracting said protein complex with polar organic alcohol to isolate a substantially water-soluble, non-toxic protein product;

(j) recovering alcohol soluble compounds from said alcohol and recycling the alcohol to said countercurrent extraction stage; and

(k) alkalinizing the water removed in step (e) and recycling said water to the contact of alfalfa in step (a).

4,077,951

L-PYROGLUTAMYL-L-PROLINAMIDE

Albert Loffet, Braine-le-Chateau, Belgium, assignor to U C B Societe Anonyme, Brussels, Belgium

Filed Jul. 7, 1976, Ser. No. 703,299

Claims priority, application United Kingdom, Jul. 8, 1975, 28678/75

Int. Cl.[2] C07C *103/52*

U.S. Cl. 260—112.5 R **2 Claims**

1. L-pyroglutamyl-L-prolinamide.

4,077,952

SOMATOSTATIN ANALOGS

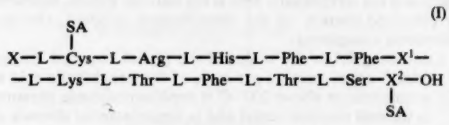
Dimitrios Sarantakis, West Chester, Pa., assignor to American Home Products Corporation, New York, N.Y.

Filed Mar. 17, 1977, Ser. No. 778,517

Int. Cl.[2] C07C *103/52;* A61K *37/00*

U.S. Cl. 260—112.5 S **6 Claims**

1. A chemical compound of the structure:



wherein A is hydrogen or the two A groups form a direct bond between the sulfur atoms; X is H, L-Ala-Gly, Gly-Gly, L-Ala-D-Ala, or Gly-Gly-Gly; X^1 is L-Trp or D-Tryp; X^2 is L-Cys or D-Cys; and the pharmacologically acceptable acid addition salts thereof.

4,077,953

TRI-DENTATE METAL COMPLEX AZO PIGMENTS

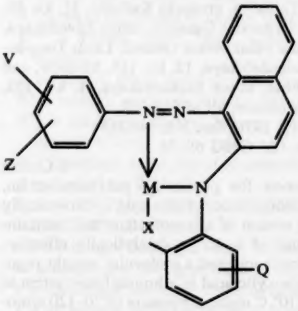
James McGeachie McCrae, Stewarton, and Christopher Midcalf, Kilbarchan, both of Scotland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 507,644, Sep. 20, 1974, abandoned. This application Sep. 3, 1976, Ser. No. 720,297

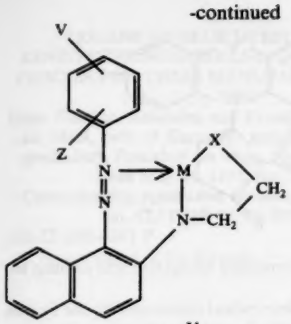
Int. Cl.[2] C09B *45/08, 45/18, 45/28;* D06P *1/10*

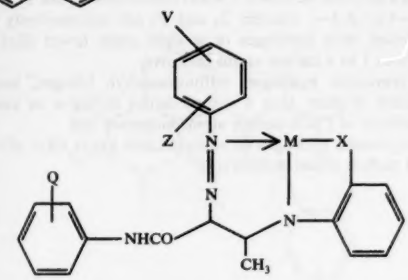
U.S. Cl. 260—149 **5 Claims**

1. A metal complex of the formula:



-continued





wherein V, Z and Q are the same or different and each is hydrogen, nitro, alkyl containing 1–4 carbon atoms, or alkoxy containing 1–4 carbon atoms, M is Zn, Cu or Ni, X is O, S, CO_2 or N—R where R is alkyl of 1–12 carbon atoms, cycloalkyl having 5 or 6 carbon atoms, aryl containing from 6–14 carbon atoms, or aralkyl containing from 7–12 carbon atoms.

4,077,954

N-(p-METHYLPHENETHYL)-4A-ARYL-TRANS-DECAHYDROISOQUINOLINES

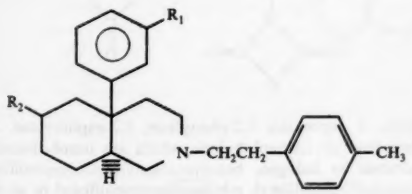
William Charles Ripka, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 656,894, Feb. 10, 1976, abandoned. This application Dec. 13, 1976, Ser. No. 749,985

Int. Cl.² C07D *217/16*

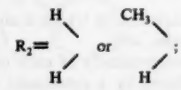
U.S. Cl. 260—289 D **5 Claims**

1. A compound of the formula:



where

R_1 = OH or OCH_3; and



and its pharmaceutically suitable salts.

4,077,955

AMINO DERIVATIVES OF 1,2,3,4-TETRAHYDRO-2-OXOPYRIDO[2,2-B]-PYRAZINE CARBOXYLIC ACIDS AND ESTERS

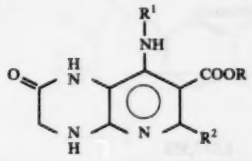
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Feb. 17, 1977, Ser. No. 769,633

Int. Cl.² A61K *31/53*; C07D *471/04*

U.S. Cl. 260—250 BC **9 Claims**

1. A compound of the formula



wherein R and R^2 each is hydrogen or lower alkyl; R^1 is hydrogen, lower alkyl, di(lower alkylamino)lower alkylene, and pharmacuetically acceptable acid addition salts thereof.

4,077,956

5-SUBSTITUTED DERIVATIVES OF DIPYRAZOLO[1,5-a:4',3'-e]PYRAZINE-6-CARBOXYLIC ACIDS AND ESTERS

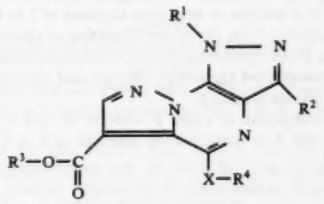
Uwe D. Treuner, Regensburg, Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 30, 1976, Ser. No. 718,748

Int. Cl.² C07D *487/14*

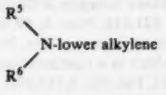
U.S. Cl. 260—250 BC **13 Claims**

1. A compound of the formula



wherein

R^1 is hydrogen, lower alkyl or phenyl-lower alkylene; R^2 and R^3 each is hydrogen or lower alkyl; R^4 is hydrogen lower alkyl, phenyl-lower alkylene or



wherein R^5 and R^6 each is hydrogen or lower alkyl or together with the nitrogen complete one of the heterocyclics pyrrolidino, piperidino, morpholino or piperazinyl;

X is oxygen or sulfur; and salts thereof.

4,077,957
6-(BROMOMETHYL)-2,4-DIAMINOPTERIDINE HYDROBROMIDE

James R. Piper, and John A. Montgomery, both of Birmingham, Ala., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Division of Ser. No. 563,466, Mar. 31, 1975. This application Apr. 11, 1977, Ser. No. 786,414
Int. Cl.[2] C07D *475/08*
U.S. Cl. 260—251.5 1 Claim

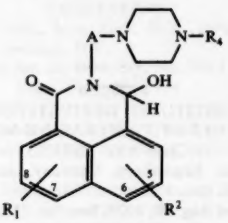
1. A compound having the formula of 6-(bromomethyl)-2,4-diaminopteridine hydrobromide.

4,077,958
2-[(SUBSTITUTED PIPERAZINYL)ALKYL]-2,3-DIHYDRO-3-HYDROXY-1H-BENZ[de]ISOQUINOLIN-1-ONES

Peter C. Wade, Pennington, N.J., and Berthold Richard Vogt, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 621,939, Oct. 14, 1975, Pat. No. 4,007,191. This application Aug. 27, 1976, Ser. No. 718,225
Int. Cl.[2] C07D *401/06, 401/14*
U.S. Cl. 260—268 TR 15 Claims

1. A compound of the formula:



wherein R^1 and R^2 are the same and are located at the 7- and 6-positions or the 8- and 5-positions respectively and are selected from the group consisting of hydrogen, Cl, Br, F, methyl and methoxy; A is straight or branched alkylene of 2 to 6 carbons; and R^4 is selected from the group consisting of phenyl, benzyl, phenethyl, monosubstituted phenyl, monosubstituted benzyl, and monosubstituted phenethyl wherein said substituent is Cl, Br, F, methyl or methoxy.

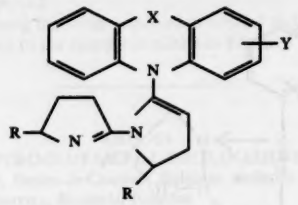
2. The compound of claim 1 wherein R^1 and R^2 are both hydrogen and A is straight chain alkylene of 2 to 6 carbons.

4,077,959
10-(BIS-PYRROLINYL)ACRIDANS

Yao Hua Wu, and Walter G. Lobeck, Jr., both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 521,618, Nov. 6, 1974, Pat. No. 3,946,004, which is a continuation-in-part of Ser. No. 336,845, Feb. 28, 1973, abandoned, which is a continuation-in-part of Ser. No. 147,667, May 27, 1971, Pat. No. 3,719,671. This application Dec. 15, 1975, Ser. No. 641,007
Int. Cl.[2] C07D *219/14*
U.S. Cl. 260—279 R 4 Claims

1. A compound selected from the group consisting of 10-(bis-pyrrolinyl)acridans represented by



and a non-toxic pharmaceutically acceptable acid addition salt thereof wherein

X is a divalent methylene radical represented by the formula $—C(Z_1Z_3)—$, wherein Z_1 and Z_2 are independently selected from hydrogen or straight chain lower alkyl of from 1 to 4 carbon atoms inclusive;

Y represents hydrogen, trifluoromethyl, halogen, lower alkyl of from 1 to 4 carbon atoms inclusive or lower alkoxy of 1 to 4 carbon atoms inclusive; and

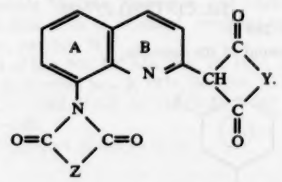
R represents hydrogen or straight chain lower alkyl of 1 to 4 carbon atoms inclusive.

4,077,960
IMIDO-QUINOLINE DYES

Keizo Shimada; Toshiaki Harada, and Masahiro Koga, all of Hino, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Jun. 8, 1976, Ser. No. 694,034
Claims priority, application Japan, Jun. 12, 1975, 50-70220; Jun. 12, 1975, 50-70221; Jun. 13, 1975, 50-70752
Int. Cl.[2] C07D *401/04;* D06P *1/649*
U.S. Cl. 260—281 NH 10 Claims

1. A compound of the formula



wherein Y represents 1,2-phenylene, 1,2-naphthylene, 2,3-naphthylene or 1,8-naphthylene which are unsubstituted or substituted by halogen, benzenesulfonyl, p-toluenesulfonyl, p-chlorobenzenesulfonyl, p-bromobenzenesulfonyl or an acyl group of the formula R—CO — or —CO—R′—CO— where R is a monovalent hydrocarbon group containing up to 10 carbon atoms and R′ is a divalent hydrocarbon group containing up to 10 carbon atoms,

Z represents 1,8-naphthylene which is unsubstituted or substituted by halogen, and

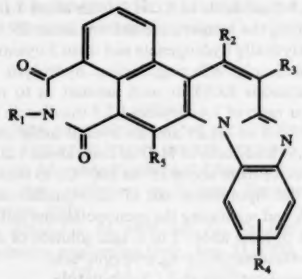
rings A and B, independently of each other, are unsubstituted or substituted by a substituent selected from the group consisting of halogen, lower alkyl, lower alkoxy and phenyl.

4,077,961
YELLOW TO BLUE DYESTUFFS OF THE BENZO-BENZIMIDAZO(1,2-a)-QUINOLINE SERIES, PROCESS FOR THEIR MANUFACTURE, AND THEIR USE

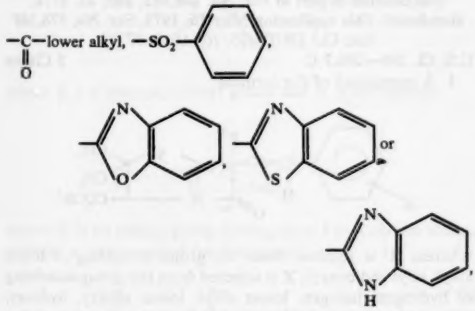
Dieter Günther, Kelkheim, and Theodor Papenfuhs, Frankfurt am Main, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

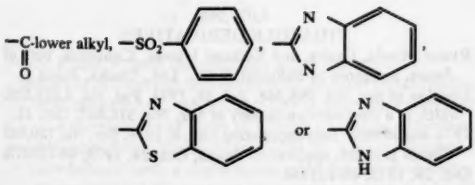
Filed May 31, 1977, Ser. No. 801,464
Claims priority, application Germany, Jun. 5, 1976, 2625518
Int. Cl.² C09B 17/04; C07D 471/16
U.S. Cl. 260—281 P 1 Claim

1. A compound of the formula



in which R_1 represents hydrogen, lower alkyl, lower alkoxy-lower alkylene- or cycloalkyl—C_3–C_6, R_2 represents hydrogen, hydroxyl or lower alkoxy, R_3 represents cyano, carboxyl, —COO-lower alkyl,





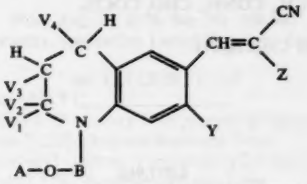
R_4 represents hydrogen or nitro, and R_5 represents hydrogen, cyano or carboxy.

4,077,962
STYRYL DYESTUFFS

Hermann Beecken, Leverkusen, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Germany

Filed Sep. 24, 1975, Ser. No. 616,263
Claims priority, application Germany, Oct. 1, 1974, 2446759
Int. Cl.² C07D 215/12, 215/14, 215/18, 215/2
U.S. Cl. 260—383 CN 8 Claims

1. Water-insoluble styryl dyestuffs of the formula



wherein

V_1, V_2 and V_4, independently of each other, are hydrogen, methyl, ethyl, propyl, or butyl;

V_3 is hydrogen or chlorine;

A is phenyl, phenyl substituted 1–5 times with chlorine or methyl, or phenyl monosubstituted with bromine cyclohexyl, phenyl, benzyl, α,α-dimethylbenzyl, methoxy, ethoxy, phenoxy, benzyloxy, tertiary-butyl, methylmercapto, phenylmercapto, chlorophenoxy, or methylphenoxy;

B is C_2- to C_5-alkylene which is unsubstituted or substituted by C_1–C_4-alkoxy, C_3–C_5-alkenyloxy, benzyloxy, phenoxy, phenyl, or mono-, di-, or tri-substituted benzyloxy, phenxoy, or phenyl wherein the substituents are methyl, ethyl, bromo, or chloro;

Z is cyano or $—CO_2R$;

R is methyl, ethyl, propyl, n-butyl, benzyl, cyclohexyl, p-chlorobenzyl, phenylethyl, γ-phenylpropyl, β-(p-tolyl-)ethyl, isopropyl, ethoxyethyl, cyanoethyl, methoxypropyl, or phenoxyethyl, and

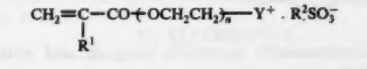
Y is hydrogen, methyl, methoxy, ethyl, ethoxy, or chloro.

4,077,963
QUATERNARY SALTS OF METHACRYLIC OR ACRYLIC ESTERS

Milan Beneš, and Jan Peška, both of Prague, Czechoslovakia, assignors to Ceskoslovensak akademie Ved, Prague, Czechoslovakia

Division of Ser. No. 302,897, Nov. 1, 1972, Pat. No. 4,011,204. This application Sep. 20, 1976, Ser. No. 725,150
Claims priority, application Czechoslovakia, Nov. 2, 1971, 7687/71; Nov. 2, 1971, 7688/71
Int. Cl.² C07D 213/89
U.S. Cl. 260—290 V 6 Claims

1. Cationic quaternary salts based upon methacrylic or acrylic esters and having the general formula II



where

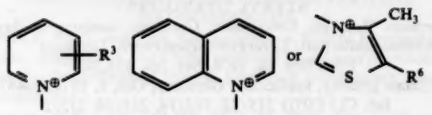
R^1 is H or CH_3

R^2 is CH_3, C_6H_5 or p-$CH_3C_6H_4$

n is 1 or 2

and

Y^+ is



where

R^3 is H, CH_3, $CONH_2$, CHO, $COCH_3$

and

R^4 is H or CH_2CH_2OH.

4,077,964

CARBAMATE-PHOSPHONATES, AND PROCESS OF PREPARATION

Serge L. Lecolier, Janville-sur-Juine, and Jean-Marie J. Biehler, Brunstatt, both of France, assignors to Societe Nationale des Poudres et Explosifs, France

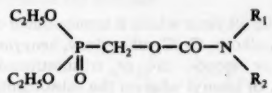
Filed Sep. 18, 1975, Ser. No. 614,706

Claims priority, application France, Oct. 17, 1974, 74.34948

Int. Cl.² C07D *207/08, 211/32;* C07F *9/40*

U.S. Cl. 260—293.86 **10 Claims**

1. Carbamate-phosphonates of the formula:



wherein R_1 and R_2 are the same or different and are linear or branched alkyl or hydroxyalkyl radicals containing 2 or 3 carbon atoms or R_1 and R_2 together with the nitrogen atom to which they are attached form a 5 or 6 member ring containing one nitrogen atom and 4 or 5 carbon atoms, or R_1 is phenyl and R_2 is hydrogen.

4,077,965

AMINOALKYL- OR HYDROXYALKYL-SUBSTITUTED THIADIAZOLE DERIVATIVES

Takashi Kamiya, Suita; Kunihiko Tanaka; Tsutomu Teraji, both of Toyonaka, and Keiji Hemmi, Kyoto, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

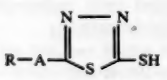
Continuation-in-part of Ser. No. 454,805, Mar. 26, 1974, abandoned. This application Sep. 27, 1974, Ser. No. 509,905

Claims priority, application Japan, Oct. 13, 1973, 48-115013

Int. Cl.² C07D *285/12*

U.S. Cl. 260—302 SD **11 Claims**

1. A compound of the formula



and its pharmaceutically acceptable inorganic acid addition salts, wherein

A is lower alkylene up to six carbons, and

R is amino which may be substituted with lower alkanoyl up to six carbons or lower alkoxycarbonyl up to seven carbons, or

R is hydroxy which may be substituted with lower alkanoyl up to six carbons.

4,077,966

METHOD FOR THE PREPARATION OF THE MONOPOTASSIUM SALT OF 1,2,5-THIADIAZOL-3,4-DICARBOXYLIC ACID, AND INTERMEDIATE PRODUCT

Giuseppe Ribaldone, Gallarate (Varese), and Renato Grecu, Cameri (Novara), both of Italy, assignors to Montedison S.p.A., Milan, Italy

Filed Mar. 9, 1977, Ser. No. 775,767

Claims priority, application Italy, Mar. 17, 1976, 21289 A/76

Int. Cl.² C07D *285/10*

U.S. Cl. 260—302 D **10 Claims**

1. A method for preparing the monopotassium salt of 1,2,5-thiadiazol-3,4-dicarboxylic acid by double stage saponification of 3,4-dicyano-1,2,5-thiadiazole, this method comprising adding aqueous KOH to an aqueous suspension of 3,4-dicyano-1,2,5-thiadiazole in such amount that the molar ratio of 3,4-dicyano-1,2,5-thiadiazole to KOH is from about 1:1.01 to 1:0.8, and maintaining the temperature at from about 20° to 50° C. to thereby catalytically hydrogenate and form 3-cyano-4-carbamoyl-1,2,5-thiadiazole, effecting further hydrolysis by adding additional aqueous KOH in such amount as to result in an overall molar ratio of 3,4-dicyano-1,2,5-thiadiazole to KOH of from about 1:2.0 to 1:2.35 and an overall molar ratio of 3,4-dicyano-1,2,5-thiadiazole to H_2O of from about 1:20 to 1:23, at a temperature of from about 85° to 100° C., to thereby form a solution of the dipotassium salt of 1,2,5-thiadaizole-3,4-dicarboxylic acid, and separating the monopotassium salt by acidifying, to a pH of from about 2 to 3, said solution of dipotassium salt of 1,2,5-thiadiazole-3,4-dicarboxylic acid.

10. 3-cyano-4-carbamoyl-1,2,5-thiadiazole.

4,077,967

6-SUBSTITUTED PENICILLANIC ACID AND DERIVATIVES THEREOF

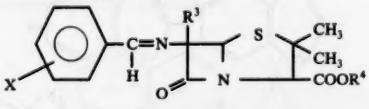
Joseph Edward Dolfini, Princeton, and Ekkehard Bohme, Hightstown, both of N.J., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 276,548, Jul. 31, 1972, which is a continuation-in-part of Ser. No. 108,952, Jan. 22, 1971, abandoned. This application May 16, 1975, Ser. No. 578,248

Int. Cl.² C07D *499/10;* A61K *31/43*

U.S. Cl. 260—306.7 C **5 Claims**

1. A compound of the formula



wherein R^3 is selected from the group consisting of lower alkyl, allyl and benzyl; X is selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, hydroxy, nitro, and amino; and R^4 is selected from the group consisting of hydrogen, lower alkyl, benzyl, diphenylmethyl, trichloroethyl and trimethylsilyl; and pharmaceutically acceptable salts thereof.

4,077,968

THIAZOLE DERIVATIVES

Ryozo Maeda, Osaka, and Katsumi Hirose, Kishiwada, both of Japan, assignors to Shionogi & Co., Ltd., Osaka, Japan

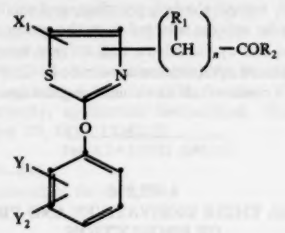
Division of Ser. No. 596,244, Jul. 16, 1974, Pat. No. 4,025,528, which is a continuation-in-part of Ser. No. 516,867, Oct. 21, 1974, abandoned. This application Oct. 8, 1976, Ser. No. 730,965

Claims priority, application Japan, Oct. 24, 1973, 48-119573; Oct. 29, 1973, 48-121534

Int. Cl.² A61K *31/38;* C07D *277/34, 277/36, 277/42*

U.S. Cl. 260—306.8 R **13 Claims**

1. A compound of the formula:



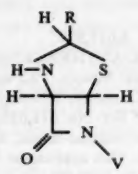
wherein R_1 is hydrogen, C_{1-5} alkyl, C_{2-5} alkenyl, C_{3-5} alkynyl, C_{3-6} cycloalkyl-C_{1-3} alkyl or C_{7-8} aralkyl; R_2 is hydroxy, C_{1-5} alkoxy or OM, wherein M is alkali metal, or one equivalent of alkaline earth metal, cupric or aluminium cation; *n* is an integer of 0 or 1; X_1 is hydrogen or C_{1-5} alkyl, and Y_1 and Y_2 are independently hydrogen, halogen, C_{1-5} alkyl, C_{1-5} alkoxy or trifluoromethyl.

4,077,969
PROCESS FOR PREPARING AZETIDINONE THIAZOLIDINE DERIVATIVES

Luigi Bernardi; Maurizio Foglio, and Giovanni Francheschi, all of Milan, Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

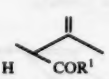
Filed Jun. 16, 1975, Ser. No. 587,090
Claims priority, application Italy, Jun. 21, 1974, 24249/74
Int. Cl.² C07D *513/04*
U.S. Cl. 260—306.7 C **2 Claims**

1. A process for preparing an azetidinone-thiazolidine derivative of the structure:

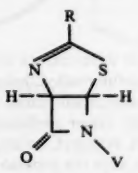


(II)

where R is a phenoxymethyl group and V is the residue:



where R^1 is an alkoxy group having from 1 to 4 carbon atoms, wherein a compound of the structure:



(I)

where R and V have the meanings given heretofore,

dissolved in a suitable solvent such as dioxane, tetrahydrofuran, methanol or ethanol, alone or in admixture is treated at a temperature of about 0° C with a solution of preferably anhydrous hydrochloric acid in a lower aliphatic alcohol and with a slight excess of sodium cyanoborohydride, keeping the reaction mass under stirring for 20–30 minutes, and after the excess of reagent is eliminated by adding a dilute acid, isolating and purifying a compound of the formula (II) thus formed.

4,077,970
METHYL-α[3'ACETOXY-1'ISOPROPENYL]-3 SUBSTITUTED 1α,5α-4-THIA 2,6 DIAZA[3,2,0]2-HEPTENE-6 ACETATE 7-ONE

Maurizio Foglio; Antonino Suarato; Paolo Masi; Giovanni Franceschi; Giorgio Palamidessi, and Luigi Bernardi, all of Milan, Italy, assignors to Societa' Farmaceutici Italia S.p.A., Milan, Italy

Filed Aug. 11, 1975, Ser. No. 603,605
Claims priority, application United Kingdom, Aug. 15, 1974, 35903/74
Int. Cl.² C07D *513/08*
U.S. Cl. 260—306.7 C **2 Claims**

1. Methyl-α-[3'-acetoxy-1'-isopropenyl]-3-phenyl1α,5α-4-thia-2,6-diaza-[3,2,0]-2-heptene-6-acetate-7-one.

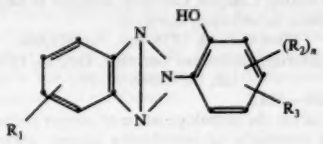
2. Methyl-α-[3'-acetoxy-1'-isopropenyl]-3-methyl-1α,5α-4-thia-2,6-diaza[3,2,0]-2-heptene-6-acetate-7-one.

4,077,971
TETRAHYDROPHTHALIMIDE METHYL-2-PHENYLBENZATRIAZOLES

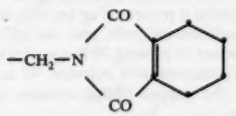
Taira Fujita, Nishinomiya; Kondo Yutaka, Tokyo; Nozomi Abe, Osaka, and Takashi Akamatsu, Ashiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Kyodo Chemical Company, Ltd., Tokyo, both of, Japan

Filed Aug. 15, 1975, Ser. No. 604,992
Claims priority, application Japan, Aug. 15, 1974, 49-93880
Int. Cl.² C07D *403/10, 403/14;* C08K *5/34*
U.S. Cl. 260—308 B **10 Claims**

1. A compound of the formula



wherein R_1 is hydrogen or a halogen atom, R_2 is



R_3 is hydrogen, a C_1–C_{18} alkyl, a C_5–C_7 cyclo alkyl or phenyl C_1–C_3 alkyl, and *n* is an integer of 1 or 2.

4,077,972
PROCESS FOR THE PREPARATION AND CONDITIONING OF COPPER PHTHALOCYANINE

Heinz-Ewald Baurecht; Reinhold Hörnle, both of Cologne; Rudolf Erdmenger, Bergisch Gladbach; Gerd Müller, Cologne, and Karlheinz Wolf, Leverkusen, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation-in-part of Ser. No. 592,897, Jul. 3, 1975, abandoned. This application Apr. 2, 1976, Ser. No. 672,854
Claims priority, application Germany, Jul. 6, 1974, 2432564; Aug. 6, 1974, 2437768
Int. Cl.² C09B *47/04*
U.S. Cl. 260—314.5 **7 Claims**

1. Process for conditioning crude copper phthalocyanine which has been synthesized in a solvent-free process, the conditioning process comprising kneading at a shear gradient of 300–20,000 sec.$^{-1}$, for a period of 10 seconds to 15 minutes, and with an energy consumption of 0.4–50 kWh/kg. copper phthalocyanine treated, a mixture of

1. 1.0 part by weight of crude copper phthalocyanine, which has not been subjected previously to extractive boiling;
2. 0.1–20 parts by weight of a salt selected from the group consisting of sodium chloride, potassium chloride, sodium sulphate, zinc chloride, aluminum chloride, aluminum sulphate, calcium carbonate, sodium acetate, potassium sodium tartrate, calcium acetate, and sodium citrate; and
3. 0.3–5 parts by weight of a solvent which is organic, inorganic or a mixture thereof which boils above 140° C, which remains liquid under the kneading conditions, and which does not dissolve significant amounts of copper phthalocyanine or of said salt.

4,077,973
SYNTHESIS OF METAL PHTHALOCYANINES

Gerardus Johannes Baptist Colbers; Johan Jozef Einerhand; Leonardus Johannes Hubertus Erkens; Hubertus Bartholomeus Nicola, all of Maastricht, and Jacobus Michiel Hubertus Snijders, Thorn, all of Netherlands, assignors to Hercules Incorporated, Wilmington, Del.

Filed Apr. 7, 1976, Ser. No. 674,341

Claims priority, application Netherlands, May 1, 1975, 7505150

Int. Cl.² C09B *47/08*

U.S. Cl. 260—314.5 **9 Claims**

1. In a process for the synthesis of metal phthalocyanines by reacting a phthalodinitrile or a phthalic anhydride and urea with a metal donor in the presence of an organic diluent, the improvement wherein the organic diluent is hexachlorobutadiene.

4,077,974
PROCESS FOR THE HALOGENATION OF COPPER PHTHALOCYANINE

Diether Wessling, Cologne, Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 14, 1975, Ser. No. 621,800

Claims priority, application Germany, Oct. 16, 1974, 2449133

Int. Cl.² C09B *47/10*

U.S. Cl. 260—314.5 **3 Claims**

1. Process for the perhalogenation of copper phthalocyanine consisting essentially of introducing copper phthalocyanine and either elemental chlorine or elemental bromine into a reaction medium consisting essentially of aluminum chloride, sulfuryl chloride and anhydrous alkali metal halide, wherein the alkali metal halide is present in an amount of from 8 to 25% by weight of aluminum chloride, and the sulfuryl chloride is present in an amount of at least 70% by weight of the aluminum chloride, at temperatures between 90 and 150° C, and perhalogenating the copper phthalocyanine in the resultant reaction medium.

4,077,975
1-VINYL-4,5,6,7-TETRAHYDROINDOLE AND PREPARATION THEREOF

Boris Alexandrovich Trofimov, ulitsa Lermontova, 321A, kv. 32; Alexandr Spiridonovich Atavin, ulitsa Lenina, 25, kv. 21; Albina Ivanovna Mikhaleva, ulitsa Lermontova, 291, kv. 6; Gennady Alexandrovich Kalabin, ulitsa Lenina, 25, kv. 18, and Ekaterina Grigorievna Chebatareva, Teatralnaya ulitsa, 19, kv. 8, all of Irkutsk, U.S.S.R.

Filed Oct. 23, 1975, Ser. No. 625,320

Int. Cl.² C07D *209/04*

U.S. Cl. 260—319.1 **8 Claims**

1. 1-vinyl-4,5,6,7-tetrahydroindole.

2. A method of preparing 1-vinyl-4,5,6,7-tetrahydroindole comprising reacting cyclohexanone oxime with acetylene at a molar ratio therebetween of 1:2–5 at a temperature within the range of from 70° to 170° C in the presence of a catalyst selected from the group consisting of alkali and alkaline earth metals and their oxides, hydroxides and alcoholates in an amount of from 1 to 50% by weight of cyclohexanone oxime and in a polar solvent selected from the group consisting of sulfoxides, sulfones, amidophosphates, phosphine oxides, t-butyl alcohol, t-amyl alcohol, pyridine, and mixtures thereof with a non-polar solvent selected from the group consisting of hydrocarbons and cyclic ethers, said solvent being taken in a volumetric ratio to cyclohexanone oxime of 1–25:1–10 with the formation of a reaction mixture containing the desired product.

4,077,976
ENAMINES, THEIR DERIVATIVES AND PROCESSES OF PRODUCTION

Gerard Bulteau, Paris; Jacques Acher, Itteville, and Jean-Claude Monier, Lardy, all of France, assignors to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France, Paris, France

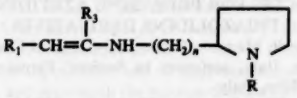
Filed Jun. 11, 1976, Ser. No. 694,877

Claims priority, application France, Jun. 12, 1975, 75 18344

Int. Cl.² C07D *207/08*

U.S. Cl. 260—326.2 **2 Claims**

1. Enamines and their non-toxic acid addition salts, said enamines having the formula:



in which R is a C_{1-5} alkyl group having or not having a hydroxy or carbonyl group, R_1 is a methyl carboxylate group, R_3 is an alkyl group with 1 to 5 carbon atoms, and *n* is 1, 2, or 3.

4,077,977
ETHENOANTHRACENES

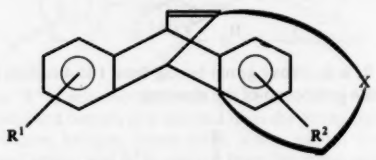
Engelbert Ciganek, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 511,026, Sep. 30, 1974, abandoned, which is a continuation-in-part of Ser. No. 417,807, Nov. 21, 1973, abandoned. This application May 27, 1976, Ser. No. 690,591

Int. Cl.² C07D *209/44*

U.S. Cl. 260—326.1 **11 Claims**

1. A compound of the formula:



wherein R^1 and R^2, alike or different, are selected from hydrogen, lower alkyl, lower perfluoroalkyl, halogen, lower alkoxy, lower alkylthio, lower perfluoroalkylthio, acyl of 1–4 carbon atoms, lower alkylsulfonyl, lower perfluoroalkylsulfonyl, di(lower alkyl)aminosulfonyl, sulfamyl, amino, lower alkylamino, and di(lower alkyl)amino; with the proviso that at least one of R^1 and R^2 is hydrogen; X is a linear chain of 3 atoms, which contains one central atom of nitrogen, the remaining atoms being carbon substituted with hydrogen; where N is substituted with H, alkyl of up to 12 carbon atoms, alkenyl of 3–4 carbon atoms attached to N by a saturated carbon atom, cycloalkyl of 3–9 carbon atoms, cycloalkenyl, cycloalkyl lower alkyl, cycloalkenyl lower alkyl, phenyl lower alkyl, adamantylmethyl, benzyl, α-furylmethyl, α-thienylmethyl, or α-phenylethyl.

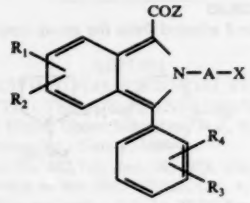
4,077,978

ISOINDOLE DERIVATIVES

Roland Jaunin, Basel, Switzerland, assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 633,514, Nov. 20, 1975, Pat. No. 3,966,374.
This application Aug. 25, 1976, Ser. No. 718,660
Claims priority, application Switzerland, Nov. 28, 1974, 15795/74; Sep. 23, 1975, 12342/75
Int. Cl.[2] C07D *209/44*
U.S. Cl. 260—326.1 17 Claims

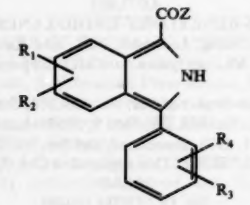
1. A compound of the formula



wherein A is alkylene containing 2–10 carbon atoms, Z is the group —OR or

R is alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl, allyl or aralkyl, R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl, R_7 and R_8, independently, are hydrogen, alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl or aralkyl, provided that at least one of R_7 and R_8 is other than hydrogen, and X is a leaving atom or group selected from the group consisting of halogen, arylsulfonyloxy or alkylsulfonyloxy.

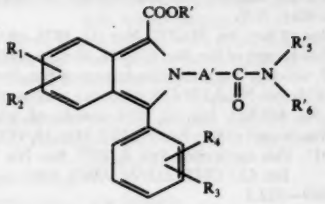
2. A compound of the formula



wherein Z is the group

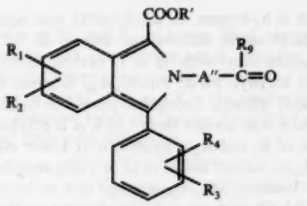
R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl, and R_7 and R_8, independently, are, cycloalkyl, cycloalkylalkyl, alkoxyalkyl or aralkyl, provided that at least one of R_7 and R_8 is other than hydrogen.

3. A compound of the formula



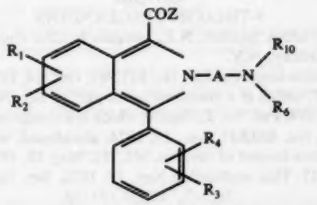
wherein R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl, R'_5 and R'_6, independently, are alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl, aryl or aralkyl, A′ is alkylene containing 1–9 carbon atoms and R′ is alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl or aralkyl.

4. A compound of the formula



wherein R_9 is hydrogen or alkyl and A″ is alkylene containing 1–9 carbon atoms, provided that A″ and R_9 together contain at most 9 carbon atoms, R′ is alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl or aralkyl, and R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl.

5. A compound of the formula



wherein A is alkylene containing 2–10 carbon atoms, Z is the group —OR or

R is alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl, allyl or aralkyl, R_1, R_2, R_3 and R_4, independently, are hydrogen, halogen, alkyl, alkoxy or trifluoromethyl, R_6 is hydrogen, alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, alkoxyalkyl, aryl or aralkyl, R_7 and R_8, independently, are hydrogen, alkyl, cycloalkyl, cycloalkylalkyl, alkoxyalkyl or aralkyl, provided that at least one of R_7 and R_8 is other than hydrogen, and R_{10} is a protecting group selected from the group consisting of acyl, carbalkoxy and carbophenylalkoxy.

4,077,979

9-THIAPROSTAGLANDINS

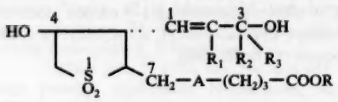
Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 741,277, Nov. 12, 1976, which is a continuation-in-part of Ser. No. 621,901, Oct. 14, 1975, Pat. No. 4,041,047, which is a continuation-in-part of Ser. No. 516,293, Oct. 21, 1974, Pat. No. 3,970,670, which is a continuation-in-part of Ser. No. 460,837, Apr. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 361,752, May 18, 1973, Pat. No. 3,881,017. This application Feb. 4, 1977, Ser. No. 765,577

Int. Cl.[2] C07D *333/48;* A01N *9/00*

U.S. Cl. 260—332.1 7 Claims

1. A 7-[3-hydroxy-3-hydrocarbylpropyl or -1-propen- or ynyl)-4-hydroxy-tetrahydro-2β-thienyl]-alkanoic or 5-alkenoic acid of the formula



wherein R is hydrogen, an alkali metal, one equivalent of an alkaline earth metal, ammonium, mono-, di- or tri-lower alkylammonium, alkyl with up to 12 carbon atoms, lower alkenyl, lower alkynyl, Ph or Ph—C_nH_{2n}, wherein Ph is phenyl, (lower alkyl) -phenyl, (halogeno)-phenyl or (trifluoromethyl)-phenyl and n is an integer from 1 to 4, A is ethylene or ethenylene, each of R_1 and R_2 is hydrogen or lower alkyl and R_3 is Ph—C_nH_{2n} as defined above or (3 to 7 ring-membered cycloalkyl or cycloalkenyl)-C_mH_{2m} wherein m is an integer from 0 to 4, or the 1,2-dihydro- or -dehydro derivatives thereof.

4,077,980

9-THIAPROSTAGLANDINS

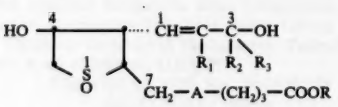
Isidoros Vlattas, Summit, N.J., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 621,901, Oct. 14, 1975, Pat. No. 4,041,047, which is a continuation-in-part of Ser. No. 516,293, Oct. 21, 1974, Pat. No. 3,970,670, which is a continuation-in-part of Ser. No. 460,837, Apr. 15, 1974, abandoned, which is a continuation-in-part of Ser. No. 361,752, May 18, 1973, Pat. No. 3,881,017. This application Nov. 12, 1976, Ser. No. 741,277

Int. Cl.[2] C07D *333/24*

U.S. Cl. 260—332.2 A 7 Claims

1. A 7-[3-hydroxy-3-hydrocarbylpropyl or -1-propen- or ynyl)-4-hydroxy-tetrahydro-2β-thienyl]-alkanoic or 5-alkenoic acid of the formula



wherein R is hydrogen, an alkali metal, one equivalent of an alkaline earth metal, ammonium, mono, di- or tri-lower alkylammonium, alkyl with up to 12 carbon atoms, lower alkenyl, lower alkynyl, Ph or Ph—C_nH_{2n}, wherein Ph is phenyl, (lower alkyl)-phenyl, (halogeno)-phenyl or (trifluoromethyl)-phenyl and n is an integer from 1 to 4, A is ethylene or ethenylene, each of R_1 and R_2 is hydrogen or lower alkyl, R_3 is alkyl with up to 12 carbon atoms, lower alkenyl or lower alkynyl, or the 1,2-dihydro derivatives or 1,2-dehydro derivatives thereof.

4,077,981

CERTAIN 1-ALKYL-2-DICHLOROPHENYLIMINOPYRROLIDINES

Edgar Enders, Cologne-Flittard, and Wilhelm Stendel, Wuppertal-Vohwinkel, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

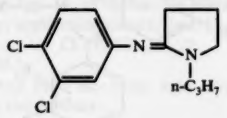
Division of Ser. No. 609,889, Sep. 2, 1975, which is a continuation of Ser. No. 380,774, Jul. 19, 1973, Pat. No. 3,927,217, which is a division of Ser. No. 151,516, Jun. 9, 1971, Pat. No. 3,787,576, which is a division of Ser. No. 834,537, Jun. 18, 1969, abandoned. This application Mar. 17, 1977, Ser. No. 778,642

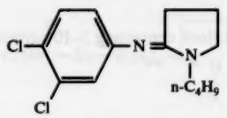
Claims priority, application Germany, Jun. 21, 1968, 1770681

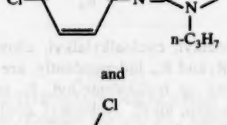
Int. Cl.[2] C07D *207/22*

U.S. Cl. 260—326.85 5 Claims

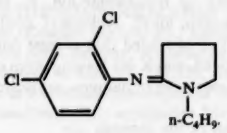
1. A compound selected from the group consisting of







and



4,077,982

5-BENZYLOXY-1,3-DIOXANES

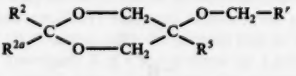
Sanford Tyler Young, Lockport, N.Y., and Kenneth Lee Hill, Doylestown, Pa., assignors to FMC Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 699,204, Jan. 19, 1968, abandoned, Ser. No. 868,278, Oct. 9, 1969, abandoned, Ser. No. 182,400, Sep. 21, 1971, abandoned, and Ser. No. 224,909, Feb. 9, 1972, Pat. No. 3,753,678. This application Oct. 2, 1972, Ser. No. 294,449

Int. Cl.[2] C07D *319/06*

U.S. Cl. 260—340.7 5 Claims

1. A herbicidally active compound of the formula



in which

R^2 is hydrogen or an alkyl, haloalkyl, cyanoalkyl, aryl, arylalkyl, aryloxyalkyl, cycloalkyl, arylalkoxyalkyl, alkoxyalkyl, alkenyl (including substituted alkenyl), alkynyl, alkylthioalkyl, alkylsulfinylalkyl or alkylsulfonylalkyl where any aryl radical is phenyl which is unsubstituted or carries a single "X" substituent as defined below:

R^5 is hydrogen, alkyl, haloalkyl or cyanoalkyl;

R′ is monovalent aromatic phenyl which is unsubstituted or has one, two or three "Y" substituents as defined below:

R^{2a} is hydrogen or alkyl; there being a cis relationship between the $—OCH_2R'$ group and any R^2 group except when R^2 and R^{2a} both are hydrogen;

X is H, F, Cl, Br, lower alkyl, trifluoromethyl, lower alkoxy or benzyloxy;

Y is H, F, Cl, Br, CN, trifluoromethyl, lower alkyl or lower alkoxy;

said compound having at least one phenyl group having an X or Y substituent other than hydrogen.

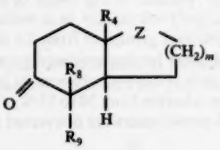
4,077,983

STEREOSPECIFIC TOTAL STEROIDAL SYNTHESIS VIA SUBSTITUTED C/D-TRANS INDANONES

Zoltan George Hajos, Upper Montclair, N.J., assignor to Hoffmann-La Roche, Inc., Nutley, N.J.

Division of Ser. No. 482,711, Jun. 24, 1974, Pat. No. 3,984,473, which is a division of Ser. No. 765,023, Oct. 4, 1968, Pat. No. 3,897,460. This application Jul. 14, 1976, Ser. No. 705,366
Int. Cl.² C07D *317/72*
U.S. Cl. 260—340.9 AS 1 Claim

1. A compound of the formula



wherein Z is ethylenedioxy-methylene; R_4 is hydrogen or lower alkyl; *m* is an integer having the value of 1 or 2; R_8 is hydrogen and R_9 is methylene-X, where X is lower-alkylarylsulfonyloxy, arylsulfonyloxy or lower-alkylsulfonyloxy,

its optical enantiomer and the racemate thereof.

4,077,984

MANUFACTURE OF PHTHALIC ANHYDRIDE FROM O-XYLENE OR NAPHTHALENE

Kurt Blechschmitt, Schifferstadt; Peter Reuter, Bad Durkheim; Friedrich Wirth, and Paul Hornberger, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Oct. 8, 1976, Ser. No. 731,005
Claims priority, application Germany, Oct. 16, 1975, 2546268
Int. Cl.² C07D *307/89*
U.S. Cl. 260—346.4 5 Claims

1. A process for the manufacture of phthalic anhydride by oxidizing o-xylene and/or naphthalene with oxygen over a supported catalyst coated with a catalytic composition containing vanadium pentoxide and titanium dioxide, at from 340° to 500° C, wherein the o-xylene and/or naphthalene is passed with an oxygen-containing carrier gas over the catalyst, and wherein the catalyst in the first 25–50 percent by volume of the total catalyst volume, in the direction of flow of the mixture of o-xylene and/or naphthalene and carrier gas, contains from 0.01 to 0.3 percent by weight, based on titanium dioxide, of rubidium, but no phosphorus, in the active composition, whilst the remainder of the catalyst contains from 0.02 to 0.8 percent by weight, based on titanium dioxide, of phosphorus, but no rubidium, in the active composition.

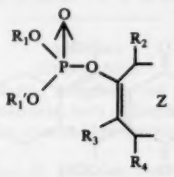
4,077,985

4-(O,O-DIESTER PHOSPHORYLOXY)CYCLOHEX-4-EN-1,2-CARBOXYLIC ANHYDRIDES

Kaspar F. Burri, West Caldwell, N.J.; Frank Kienzle, Therwill, Switzerland, and Perry Rosen, North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 618,853, Oct. 2, 1975, Pat. No. 4,025,584, which is a division of Ser. No. 497,598, Aug. 15, 1974, Pat. No. 3,933,948. This application Feb. 7, 1977, Ser. No. 766,320
Int. Cl.² C07F *9/117*
U.S. Cl. 260—346.6 4 Claims

1. A compound of the formula



wherein each of R_1 and R_1' is lower alkyl, phenyl, phenyl substituted by one or more lower alkyl, fluorine, chlorine, bromine, nitro and lower alkoxy or benzyl, each of R_2, R_3 and R_4 is hydrogen or lower alkyl and Z is the residue of a dienophile moiety selected from the group consisting of maleic anhydride and citraconic anhydride.

4,077,986

BORIDE CATALYST FOR EPOXIDIZING OLEFINIC COMPOUNDS

Robert Malone Gipson, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Division of Ser. No. 565,004, Apr. 4, 1975, Pat. No. 4,038,290. This application Jul. 9, 1976, Ser. No. 703,867
Int. Cl.² C07D *301/20*
U.S. Cl. 260—348.29 2 Claims

1. A method for the liquid phase epoxidation of an olefin having from about 2 to about 60 carbon atoms with an organic hydroperoxide comprising the step of:

intimately contacting said olefin with said organic hydroperoxide at lower temperatures of about 25° C to about 200° C and pressures sufficient to maintain the product and reactants substantially in liquid phase in the presence of a catalytically effective amount of a binary boride of boron and nickel.

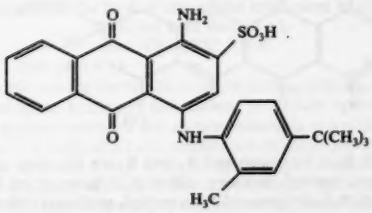
4,077,987

WATER-SOLUBLE ANTHRAQUINONE DYESTUFF

Wolfgang Harms, and Dieter Hüllstrung, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 24, 1976, Ser. No. 660,990
Claims priority, application Germany, Feb. 27, 1975, 2508506
Int. Cl.² C09B *1/32, 1/34*
U.S. Cl. 260—374 1 Claim

1. Water-soluble anthraquinone dyestuff which in the form of the free acid corresponds to the formula

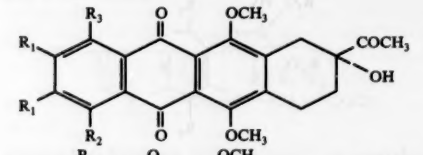


4,077,988
OPTICALLY ACTIVE ANTHRACYCLINONES

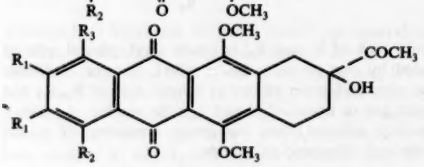
Federico Arcamone, Nerviano; Luigi Bernardi, Milan; Bianca Patelli, Milan, and Aurelia Di Marco, Milan, all of Italy, assignors to Societa' Farmaceutici Italia, S.p.A., Milan, Italy

Filed Jan. 16, 1976, Ser. No. 649,825
Claims priority, application United Kingdom, Jan. 22, 1975, 02691/75
Int. Cl.² C07C *49/68, 49/72;* A61K *31/12*
U.S. Cl. 260—376 2 Claims

1. Optically active anthracyclinones of the formulae IV′ and IV″



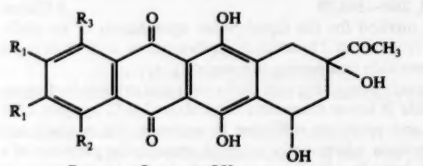
IV′



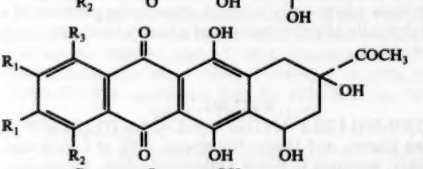
IV″

wherein R_1 is hydrogen and R_2 and R_3 are the same and are hydrogen, methyl, methoxy, chlorine or bromine; or R_2 and R_3 are both hydrogen and R_1 is methyl, methoxy, chlorine or bromine; or R_1 and R_3 are both hydrogen and R_2 is methoxy with the proviso that R_1, R_2 and R_3 are not all simultaneously hydrogen in the case of formula IV′.

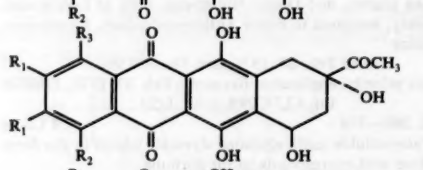
2. An optically active anthracyclinone of the general formula VIII′, VIII″, VIII‴ or VIII⁗:



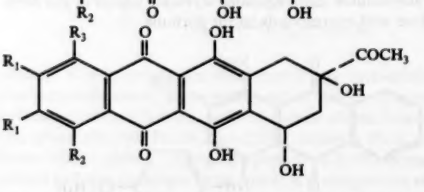
VIII′



VIII″



VIII‴



VIII⁗

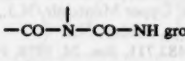
wherein R_1 is hydrogen and R_2 and R_3 are the same and are hydrogen, methyl, methoxy, chlorine or bromine; or R_2 and R_3 are both hydrogen and R_1 is methyl, methoxy, chlorine or bromine; or, in the case of formulae VIII″, VIII‴ and VIII⁗, R_1 and R_3 are both hydrogen and R_2 is methoxy.

4,077,989
PROCESS FOR THE PRODUCTION OF MODIFIED POLYISOCYANATES

Walter Schäfer, and Kuno Wagner, both of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Continuation of Ser. No. 598,105, Jul. 22, 1975, abandoned. This application Nov. 23, 1976, Ser. No. 744,585
Claims priority, application Germany, Jul. 30, 1974, 2436741
Int. Cl.² C07C *125/04*
U.S. Cl. 260—404.5 2 Claims

1. A process for the production of modified isocyanates containing urethane groups, having an NCO-content of from about 0.5 to about 25% by weight, a



content of from about 0.5 to about 50% by weight, and an —N=C=N— group content of from about 0 to about 25% by weight, said process comprising

(a) reacting alkane diols or triols having molecular weights below 200 or polyhydroxyl polyesters or polyethers having molecular weights in the range of from 400 to 4000 with organic polyisocyanates in a molar ratio of NCO-groups to hydroxyl groups of from 2:1 to 15:1 to provide NCO-prepolymers having urethane groups,

(b) subjecting said NCO-prepolymers to partial carbodiimide formation wherein from 50 to 95% of the NCO groups of said NCO-prepolymers are converted to carbodiimides, and

(c) reacting the products of step (b) with carboxylic acids the quantities of (b) and (c) being such that from 0.2 to 1.2 gram equivalents carboxylic groups are reacted per gram equivalent of carbodiimide groups.

4,077,990
SURFACE-ACTIVE AGENT

Kenneth W. Prodo, Westfield, and Robert W. Bender, Jersey City, both of N.J., assignors to Kewanee Industries, Bryn Mawr, Pa.

Filed Oct. 26, 1976, Ser. No. 735,693
Int. Cl.² C09S *5/00*
U.S. Cl. 260—404.5 1 Claim

1. 10-undecylenoylamidopropyldimethylamine oxide.

4,077,991
COPOLYMERS OF GLYCIDOL AND GLYCIDYL ESTERS

Violete L. Stevens; Arthur R. Sexton, both of Midland, Mich., and Frederick P. Corson, Sudbury, Mass., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 466,099, May 2, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,539
Int. Cl.² C08H *3/00;* C09F *7/06*
U.S. Cl. 260—407 8 Claims

1. A compound of the formula

$R[(R'O)_mX]_n$

wherein R is the residue left by the removal of n active hydrogen atoms from an initiator for alkylene oxide polymerization; each R′ independently is an alkylene radical selected from the group consisting of ethylene, trimethylene, tetramethylene, 1,2-butylene, 2,2-bis(halomethyl)-1,3-propylene, phenylethylene and groups of the formula

$-CH_2CHCH_2A$

each A independently is H, Cl, Br, or OX; each X independently is H or the acyl radical of a carboxylic acid free of α,β-unsaturation

with the proviso that at least one R′ is 3-hydroxy-1,2-propylene and at least one is a group of the formula

$-CH_2CH\ CH_2OX$

wherein X is the acyl radical of a fatty acid comprised of at least three carbon atoms and free of α,β-unsaturation and *m* and *n* are integers such that the total number of R′O groups is at least 2, *n* being 1–8.

5. The compound of claim 4 wherein the acyl radicals are derived from an alkanoic acid of 3–20 carbon atoms.

4,077,992

HIGH TEMPERATURE LUBRICANT

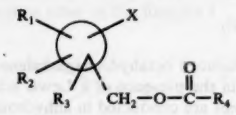
Anthony M. Fusco, Spartanburg, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Division of Ser. No. 568,047, Apr. 14, 1975, Pat. No. 4,044,033. This application Oct. 4, 1976, Ser. No. 729,257

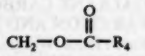
Int. Cl.² C09F *5/08*; C11C *3/00*

U.S. Cl. 260—410 **5 Claims**

1. A high temperature lubricant comprising a gem disubstituted alicyclic compound in which the ring portion of said compound contains from 5 to 7 carbon atoms and said compound is represented by the formula



wherein R_1 and R_2 are selected from H and lower alkyl groups, X is a polyalkyleneoxy chain and the gem radicals are R_3 and



wherein R_3 is an alkyl group containing from 1 to about 6 carbon atoms and R_4 is an alkyl or alkylene group containing from about 3 to 20 carbon atoms.

4,077,993

METHOD FOR THE PREPARATION OF ALKOXYSILANE CLUSTER COMPOUNDS

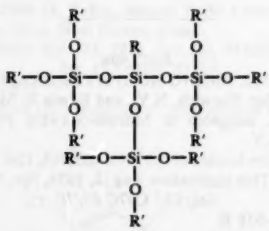
Karl O. Knollmueller, Hamden, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Apr. 27, 1977, Ser. No. 791,358

Int. Cl.² C07F *7/04*, *7/18*

U.S. Cl. 260—448.8 R **5 Claims**

1. In a method for preparing an alkoxysilane cluster compound of the formula:



wherein R is hydrogen, alkyl, alkenyl, aryl or aralkyl, and each R′ is independently selected from alkyl, alkenyl, aryl or aralkyl with the proviso that at least a majority of R′ radicals are sterically hindered alkyl groups having at least 3 carbons atoms,

comprising reacting a trihalosilane of the formula:

$R-SiX_3$

wherein each X is a halogen and R is as defined above, with a trialkoxysilanol of the formula:

$HOSi(OR')_3$

wherein R′ is as defined above, in the presence of an acceptor base compound, an improvement characterized by reacting about 2.8 to about 3.3 moles of trialkoxysilanol per mole of the trihalosilane in the presence of about 3.5 to about 4.5 moles of acceptor base per mole of trihalosilane, in a non-protonic solvent medium comprising about 0.8 to about 1.8 parts solvent per part total reactants by volume, said reaction being carried out at a temperature of about −5° C to about 60° C.

4,077,994

SILOXANES

William Grenville Davies, Longfield, and Howard Victor Andrew Beedle, Swanscombe, both of England, assignors to The Associated Portland Cement Manufacturers Limited, London, England

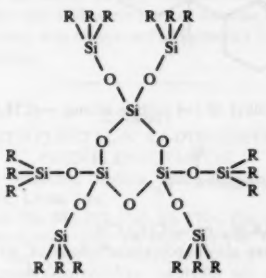
Filed Sep. 16, 1975, Ser. No. 613,864

Claims priority, application United Kingdom, Sep. 24, 1974, 41495/74

Int. Cl.² C07F *7/08*

U.S. Cl. 260—448.2 E **12 Claims**

1. A method of producing a cyclic siloxane by silylating pseudo wollastonite with a chlorosilane characterised by reacting the pseudo wollastonite at ambient or elevated temperature with the chlorosilane in a ketone, in the presence of a minor molar proportion with respect to the chlorosilane, of a hydroxy compound soluble in the reaction medium, and purifying the resulting reaction mixture to recover the cyclic siloxane therefrom, the chlorosilane being R_3SiCl and the cyclic siloxane produced being of the general formula:



wherein the members R may differ and each R is selected from the group comprising hydrogen and the substituted and unsubstituted radicals alkyl, aryl, alkaryl and alkenyl.

4,077,995

PROCESS FOR SYNTHESIZING LOW BOILING ALIPHATIC HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN

Surjit Singh Khera, Upper Arlington, Ohio, assignor to Battelle Development Corporation, Columbus, Ohio

Filed Nov. 28, 1975, Ser. No. 635,845

The portion of the term of this patent subsequent to Dec. 14, 1993, has been disclaimed.

Int. Cl.² C07C *27/06*

U.S. Cl. 260—449.6 M **7 Claims**

1. A process for the synthesis of low boiling aliphatic hydrocarbons from hydrogen and carbon monoxide which comprises passing hydrogen and carbon monoxide in a molar ratio of about 1:2 to about 2:1 at a temperature of about 350° to about 450° C. and a pressure of about 600 p.s.i.g. to about 10,000 p.s.i.g. at a space velocity of about 200 to about 6000 in contact with a catalyst comprising a sulfided, interspersed mixture of

cobalt oxide, aluminum oxide and zinc oxide which mixture by elemental analysis contains less than about 0.5 weight percent of alkali metal, said catalyst prior to sulfiding comprising about 1 to about 15 weight percent of cobalt oxide, about 55 to about 85 weight percent of aluminum oxide and about 15 to about 30 weight percent of zinc oxide, the sulfur content by elemental analysis of the catalyst comprising about 2.0 to about 12.0 percent by weight of the final catalyst composition and recovering a low boiling aliphatic hydrocarbon product of said synthesis consisting predominantly of a mixture of methane, ethane, propane, carbon dioxide and unconverted hydrogen and carbon monoxide.

4,077,996

PROCESS FOR THE PREPARATION OF TRANS-DECA HYDRONAPHTHALENE DERIVATIVES

Gerhard Sauer; Ulrich Eder; Gregor Haffer; Günter Neef, and Rudolf Wiechert, all of Berlin, Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

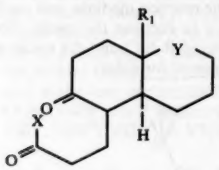
Filed Apr. 14, 1976, Ser. No. 676,805

Claims priority, application Germany, Apr. 14, 1975, 2516544

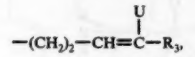
Int. Cl.[2] C07C *120/00, 121/46;* **C07D** *319/02, 319/04*

U.S. Cl. 260—464 **20 Claims**

1. A process for preparing a trans-decahydronaphthalene compound of the formula



wherein X is alkyl of 1-4 carbon atoms, $-(CH_2)_3-Z-R_2$



$-(CH_2)_3COOR_4$, or $-(CH_2)_3CN$;

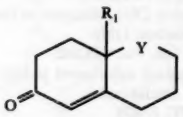
Y and Z are alkylenedioxymethylene of up to 6 carbon atoms in the alkylene, hydroxymethylene, alkanoyloxymethylene or aroyloxymethylene of up to 10 carbon atoms in the alkanoyl or aroyl or alkoxymethylene of up to 6 carbon atoms in the alkoxy;

U is chlorine or bromine;

R_1, R_2, and R_3 are alkyl of 1-4 carbon atoms; and

R_4 is alkyl of 1-10 carbon atoms; comprising the steps of:

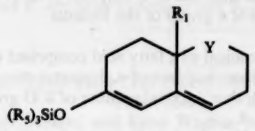
(a) reacting an octahydronaphthalene compound of the formula



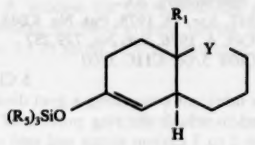
in the presence of a base, with a trialkyl chlorosilane of the formula

$(R_5)_3Si-Cl$

wherein R_5 is alkyl of 1-4 carbon atoms, to produce a hexahydronaphthalene compound of the formula



(b) hydrogenating the thus-produced hexahydronaphthalene compound in an inert solvent with hydrogen in the presence of a platinum-, palladium-, or rhodium-containing hydrogenation catalyst, to an ocathydronaphthalene compound of the formula



and (c) reacting a vinyl ketone of the formula

$XCOCH=CH_2$

with the thus-produced octahydronaphthalene compound in an inert solvent in the presence of a Lewis acid; wherein all three reaction steps are conducted in anhydrous, alcohol-free solvents.

4,077,997

DIPHOSPHONOALKANE CARBOXYLIC ACIDS, PROCESS OF PREPARATION AND METHODS OF USE

Helmut Blüm, and Karl-Heinz Worms, both of Dusseldorf, Germany, assignors to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA), Dusseldorf-Holthausen, Germany

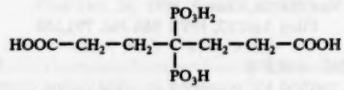
Filed Jan. 21, 1977, Ser. No. 761,271

Claims priority, application Germany, Jan. 21, 1976, 2602030

Int. Cl.[2] C07F *9/38;* **A61K** *7/16, 31/185*

U.S. Cl. 260—502.4 P **2 Claims**

1. A diphosphonoalkane carboxylic acid selected from the group consisting of (A) a compound of the formula



and (B) a non-toxic, pharmacologically-acceptable water-soluble salt thereof.

4,077,998

PHTHALOYL AMINO ACID HYDROXAMIC ACIDS

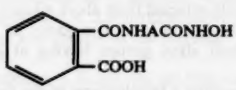
Dyral C. Fessler, Norwich, N.Y., and Edwin R. Micalizzi, Allegan, Mich., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Continuation-in-part of Ser. No. 625,915, Oct. 28, 1975, abandoned. This application Aug. 4, 1976, Ser. No. 711,626

Int. Cl.[2] C07C *83/10*

U.S. Cl. 260—518 R **7 Claims**

1. A compound of the formula:



wherein A is methylene, ethylene or

wherein R is methyl, isobutyl, benzyl, or 4-aminobutyl and in which

is in the D-configuration.

4,077,999
NOVEL OXIME ETHERS

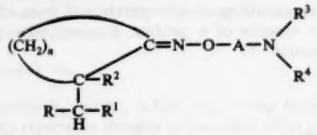
Zoltán Budai; Aranka Lay nee Konya; Tibor Mezei; Katalin Grasser; Enikö Szirt nee Kiszelly; Ibolya Kosöczky, and Lujza E. Petöcz, all of Budapest, Hungary, assignors to Egyt Gyogyszervegyeszeti Gyar, Budapest, Hungary

Division of Ser. No. 652,806, Jan. 27, 1976. This application Dec. 10, 1976, Ser. No. 749,399

Int. Cl.[2] C07C *131/02, 131/04*

U.S. Cl. 260—566 AE **2 Claims**

1. A novel oxime ether of the formula I



(I)

wherein

R stands for a phenyl group which may be substituted by a halogen atom or by one or more C_1–C_4 alkoxy, hydroxyl, nitro or di(C_1–C_3 alkyl)amino groups,

R^1 and R^2 denote each a hydrogen atom or together a valence bond,

A denotes a C_2–C_4 straight or branched-chain alkylene group,

n denotes an integer from 3 to 10, and

R^3 and R^4 denote a C_1–C_4 alkyl group, or a pharmaceutically acceptable acid addition salt or quaternary ammonium salt thereof.

4,078,000
METHOD OF ISOLATING AND RECOVERING 2,4-DINITRO-N-SUBSTITUTED-1,3-PHENYLENEDIAMINE COMPOUNDS

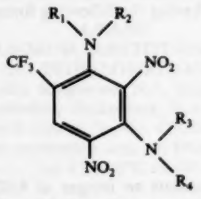
David F. Gavin, Cheshire, Conn.; Delmer A. Fidler, Rochester, N.Y., and John H. Tobin, Beacon Falls, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed Nov. 22, 1976, Ser. No. 744,015

Int. Cl.[2] C07C *85/04*

U.S. Cl. 260—577 **10 Claims**

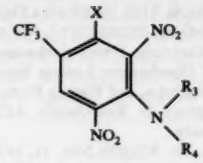
1. In a process for preparing a compound of the formula:



I

which comprises reacting

(1) a compound of the formula:



II

with

(2) a stoichiometric excess of an amine or ammonia as represented by the formula:

NHR_1R_2 III

wherein, as applied to said formulas, R_1, R_2, R_3 and R_4 are each selected from hydrogen, lower alkyl, lower alkenyl, lower alkynyl, cyclo lower alkyl and cyclo lower alkenyl groups, said groups other than hydrogen being unsubstituted or having chloro, bromo, iodo, hydroxy or lower alkoxy substituents, with the proviso that at least one of R_1, R_2, R_3 or R_4 is not hydrogen; and X is a reactive halogen; said reaction being carried out in the presence of a polar organic solvent and resulting in a reaction product mixture comprised of a compound of said formula I, unreacted NHR_1R_2, said organic solvent and water-soluble by-products,

the improvement for isolating and recovering said compound of formula I which comprises:

a. adjusting the pH of the reaction product mixture in the presence of water to between about 2.5 and about 7.5,

b. azeotropically distilling said reaction product mixture in the presence of water to vaporize and remove substantially all of said polar organic solvent along with part of the water, leaving a residual mixture comprised of water and said compound of formula I, and

c. recovering said compound of formula I from said residual mixture.

4,078,001
N-1,3-DIMETHYLBUTYL-N'-1,4-DIMETHYLPENTYL-p-PHENYLENEDIAMINE

Charles Gene Summers, Medina, Ohio, assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 513,712, Oct. 10, 1974, Pat. No. 3,929,855. This application Aug. 18, 1975, Ser. No. 605,611

Int. Cl.[2] C07C *87/58;* C08G *6/00*

U.S. Cl. 260—577 **1 Claim**

1. N-1,3-dimethylbutyl-N'-1,4-dimethylpentyl-p-phenylenediamine.

4,078,002
REDUCTION OF CHEMICAL COMPOUNDS WITH 9-BBN

Herbert C. Brown, West Lafayette, Ind., assignor to Aldrich-Boranes, Inc., Milwaukee, Wis.

Division of Ser. No. 413,866, Nov. 8, 1973, Pat. No. 3,984,479. This application Dec. 3, 1975, Ser. No. 637,318

Int. Cl.[2] C07C *83/00*

U.S. Cl. 260—583 K **11 Claims**

1. A process for the reduction of a chemical compound having a reducible functional group selected from carbonyl, nitro, azo, oxime, isocyanate, sulfone, sulfonic acid, sulfoxide, thioamide, thioketone, methylenephosphorane, iminophosphorane, iminosulfurane, phosphine oxide, thiophosphate and epoxide groups, which process comprises reacting said compound with an effective quantity of 9-BBN at a temperature below the decomposition temperature of the reactants or the resulting products.

4,078,003

METHOD FOR THE PREPARATION OF 1,3-DIAMINO-2,2-DIMETHYL PROPANE

Hans Feichtinger, Dinslaken; Heinz Aschmann; Hans-Walter Birnkraut, both of Oberhausen; Ludwig Brinkmann, Frankfurt am Main-Schwanheim, and Werner Pluta, Andernach, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

Continuation of Ser. No. 522,690, Nov. 11, 1974, abandoned. This application Sep. 14, 1976, Ser. No. 723,330

Claims priority, application Germany, Nov. 23, 1973, 2358355

Int. Cl.[2] C07C *85/06*

U.S. Cl. 260—583 P 3 Claims

1. A process for the production of 1,3 diamino-2,2 dimethyl propane comprising contacting neopentyl glycol, ammonia and hydrogen at a temperature of 150° – 300° C. and a pressure of at least 10 atmospheres in the presence of a nickel catalyst on a carrier, said catalyst containing 23 to 60% by weight of nickel and 16 to 40% by weight of chromium, and the hydroxyl group to ammonia ratio is 1:6 to 1:20.

4,078,004

METHACROLEIN PRODUCTION UTILIZING NOVEL CATALYST

Francis W. Schlaefer, Pennsauken, N.J., and George A. Hansen, Philadelphia, Pa., assignors to Rohm and Haas Company, Philadelphia, Pa.

Division of Ser. No. 178,434, Sep. 7, 1971, Pat. No. 3,839,227, and a continuation-in-part of Ser. No. 149,343, Jun. 2, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 428,150

Int. Cl.[2] C07C *45/04*

U.S. Cl. 260—604 R 13 Claims

1. In a method of oxidizing isobutylene, at temperature of 350°–550° C in the vapor phase, the principal product, being methacrolein, the improvement of conducting said oxidation in the presence of a particulate calcined catalyst in the form of a metal oxide catalyst on a support consisting essentially of expanded perlite having, prior to formation and calcination of the catalyst, a total surface area of less than 15 $m^2/g.$, a total porosity of at least 2.5 cc./g., at least 40 percent of the pores being greater than 100,000 A in diameter, and no more than 25 percent of the pores being less than 100,000 A in diameter.

4,078,005

PROCESS FOR THE PRODUCTION OF ALKOXYTETRABROMOCTANES

Klaus Diebel, and Manfred Schröder, both of Marl, Germany, assignors to Chemische Werke Huels Aktiengesellschaft, Marl, Germany

Filed Jan. 7, 1976, Ser. No. 647,155

Claims priority, application Germany, Jan. 10, 1975, 2500766

Int. Cl.[2] C07C *41/00*

U.S. Cl. 260—614 R 12 Claims

1. In a process for the tetrabromination with bromine of a liquid octadienyl ether to produce the corresponding tetrabromooctane ether, the improvement which comprises adding the bromine to an aqueous suspension of the liquid octadienyl ether at 0° C. to 40° C. and wherein the aqueous suspension contains up to 10% by weight of an alkaline or neutral mineral salt, based on the water.

4,078,006

PROCESS FOR PREPARING DIHYDRIC PHENOL DERIVATIVES

Sumio Umemura; Nagaaki Takamitsu; Toshikazu Hamamoto, and Nobuyuki Kuroda, all of Ube, Japan, assignors to UBE Industries, Ltd., Ube, Japan

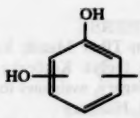
Continuation-in-part of Ser. No. 558,700, Mar. 17, 1975, abandoned. This application Apr. 30, 1976, Ser. No. 682,064

Claims priority, application Japan, Apr. 4, 1974, 49-37318; May 7, 1974, 49-49811

Int. Cl.[2] C07C *39/08*

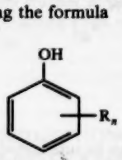
U.S. Cl. 260—621 G 17 Claims

1. A process preparing a dihydric phenol having the formula:



wherein R represents a lower alkyl radical having 1–6 carbon atoms and each R may be the same or different, and *n* represents zero or an integer of from 1 to 4 and when *n* is 3 or 4 not all of the 2-, 4- and 6-positions are occupied with the said alkyl radicals,

which comprises oxidizing, at a temperature of from 45° C. to 200° C. in the absence of a catalyst, a monohydric phenol having the formula



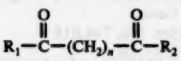
wherein R and *n* have the same meanings as above, with hydrogen peroxide in the presence of a ketone selected from the group consisting of:

i. a ketone having 3–20 carbon atoms represented by the following formula:

$$R_1—CO—R_2$$

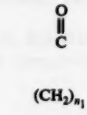
wherein R_1 and R_2, which may be the same or different, each represents straight or branched alkyl groups of 1–18 carbon atoms or a phenyl group, the alkyl groups being unsubstituted or substituted with a halogen atom, and at least one of R_1 and R_2 may be an aliphatic group having an unsaturated bond;

ii. a diketone having 3–20 carbon atoms represented by the following formula:



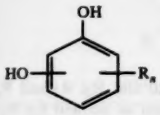
wherein *n* is zero or an integer of 1–16, inclusive, and R_1 and R_2 have the same meanings as above; and

iii. a cycloketone having the following formula:

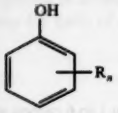


wherein n_1 represents an integer of 4–11, inclusive, 2-ethyl-1-cyclopentanone or 2-methyl-1-cyclohexanone; the molar ratio of hydrogen peroxide to said monohydric phenol being from 0.01 to 0.50.

11. A process for preparing a dihydric phenol having the formula:

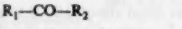


wherein R represents a lower alkyl radical having 1–6 carbon atoms and each R may be the same or different, and *n* represents zero or an integer of from 1 to 4 and when *n* is 3 or 4 not all of the 2-, 4- and 6-positions are occupied with the said alkyl radicals,
which comprises oxidizing, at a temperature of from 45° C. to 200° C., a monohydric phenol having the formula



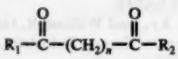
wherein R and *n* have the same meanings as above, with hydrogen peroxide in the presence of a ketone selected from the group consisting of:

i. a ketone having 3–20 carbon atoms represented by the following formula:



wherein R_1 and R_2, which may be the same or different, each represents straight or branched alkyl groups of 1–18 carbon atoms or a phenyl group, the alkyl groups being unsubstituted or substituted with a halogen atom, and at least one of R_1 and R_2 may be an aliphatic group having an unsaturated bond;

ii. a diketone having 3–20 carbon atoms represented by the following formula:



wherein *n* is zero or an integer of 1–16, inclusive, and R_1 and R_2 have the same meanings as above; and

wherein n_1 represents an integer of 4–11, inclusive, 2-ethyl-1-cyclopentanone or 2-methyl-1-cyclohexanone;
and a catalytic amount of a catalyst selected from the group consisting of sulfuric acid, a salt thereof, a sulfonic acid and a salt thereof; the molar ratio of hydrogen peroxide to said monohydric phenol being from 0.01 to 0.50.

4,078,007

FLUORINE SUBSTITUTION IN 1,1,1-TRIHALOMETHANES

Louis L. Ferstandig, Ridgewood, N.J., assignor to Halocarbon Products Corporation, Hackensack, N.J.

Continuation-in-part of Ser. No. 619,534, Oct. 3, 1975, abandoned. This application Aug. 10, 1976, Ser. No. 712,401
Int. Cl.² C07C *19/08*
U.S. Cl. 260—653.7 **17 Claims**

1. A process for substituting fluorine in place of other halogen atoms on the 1-carbon atom of a 1,1,1-trihaloalkane comprising contacting said 1,1,1-trihaloalkane with liquid HF in the presence of mixture of antimony pentahalide with at least an approximately equimolar amount of antimony trihalide at a temperature from about room temperature to about 85° C and a pressure from about 20 to 100 psig, the halogen atoms of the antimony trihalide and pentahalide being selected from the group consisting of chlorine and fluorine.

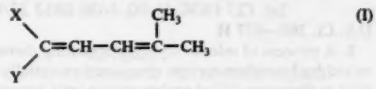
4,078,008

PROCESS FOR THE PREPARATION OF DIENES

Reinhard Lantzsch; Dieter Arlt, both of Cologne, and Ernst Kysela, Bensberg, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

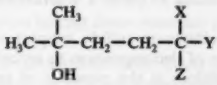
Filed Jul. 22, 1976, Ser. No. 707,783
Claims priority, application Germany, Aug. 16, 1975, 2536504
Int. Cl.² C07C *17/34, 21/04, 21/14, 21/18*
U.S. Cl. 260—655 **23 Claims**

1. A process for the preparation of a diene of the formula



(I)

wherein
X and Y are independently fluorine, bromine or chlorine
which comprises contacting a 1,1,1-trihalo-4-methyl-4-hydroxy-pentane of the formula



(II)

wherein
X and Y have the previously assigned significance and Z is chlorine or bromine with a dehydrohalogenation agent and a dehydration agent under respectively dehydrohalogenation and dehydration conditions.

4,078,009

SELECTIVE PRODUCTION OF PARA-XYLENE

Warren W. Kaeding, Westfield, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Division of Ser. No. 638,864, Dec. 8, 1975, Pat. No. 4,029,716. This application Mar. 18, 1977, Ser. No. 779,119
Int. Cl.² C07C *3/03;* B01J *21/02;* C01B *29/28*
U.S. Cl. 260—673 **11 Claims**

1. A process for the selective production of paraxylene which comprises contacting, under conversion conditions, a charge stock consisting essentially of a C_3–C_{10} olefin with a catalyst consisting essentially of a crystalline aluminosilicate zeolite having a silica to alumina ratio of at least about 12 and a constraint index within the approximate range of 1 to 12, said zeolite having combined therewith boron in an amount of at least about 0.2 percent by weight as a result of reaction of said zeolite with a boron-containing compound; cooling the resulting product and separating para-xylene therefrom.

4,078,010

HYDROGENATED OLEFINE OLIGOMERS

Marcel Prillieux; Marcel Robert, and Robert Tirtiaux, all of Mont-Saint-Aignan, France, assignors to Exxon Research & Engineering Co., Linden, N.J.

Filed Jul. 11, 1975, Ser. No. 595,057
Claims priority, application Jul. 17, 1974 France 74.24784
Int. Cl.² C07C *3/18, 11/00*
U.S. Cl. 260—676 R **9 Claims**

1. Process for manufacturing selectively, with a high yield, a highly paraffinic hydraulic transmission oil consisting essentially of isoparaffins and substantially free of cycloparaffins and aromatics, for use in hydraulic systems having elastomeric

seals, said oil being compatible with said seals and tending to shrink said seals when of polyurethane rubber, and said oil having a flash point above 100° C. and a viscosity within the range from 2 to 30 Centistokes at 37.8° C., said process comprising:

oligomerising propylene, in the liquid phase, in the presence of a Friedel and Crafts catalyst, at a temperature between 20° C. and 80° C., separating the catalyst and propylene oligomer, and hydrogenating said oligomer or a fraction thereof to thereby obtain said oil.

4,078,011

SELECTIVE HYDROGENATION OF DIENES USING NICKEL/ALUMINUM SULFIDE CATALYST

Peter W. Glockner, Houston, and J. David Richardson, Sugarland, both of Tex., assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 22, 1977, Ser. No. 789,893
Int. Cl.[2] C07C *11/00, 5/06;* B01J *27/04*
U.S. Cl. 260—677 H **8 Claims**

1. A process of selectively hydrogenating dienes present in a mixed hydrocarbon stream composed essentially of hydrocarbons in the range of 3–6 carbon atoms, said process comprising contacting said mixed hydrocarbon stream with added hydrogen at a temperature of between about 150° F and about 500° F and a pressure of about 1 to about 1000 atmospheres in the presence of a catalyst comprising about 1 to about 30% by weight nickel on an aluminum sulfide support.

2. A process according to claim 1 wherein said catalyst is prepared by:

a. contacting an aluminum sulfide support with a nickel complex capable of decomposition to nickel metal under anhydrous conditions in the presence of an aprotic solvent;

b. heating the solution from step (a) under refluxing conditions for between about 1 hour and about 10 hours;

c. recovering the resulting nickel/aluminum sulfide catalyst from the solution; and

d. calcining the nickel/aluminum sulfide catalyst at a temperature of between about 500° F and about 1000° F in an inert atmosphere.

3. A process according to claim 2 wherein said aluminum sulfide support is prepared by heating a solution of a trialkyl aluminum having 1 to 5 carbon atoms in an aprotic solvent with a stoichiometric amount of hydrogen sulfide under anhydrous conditions at a temperature of between about 100° F and about 400° F and a pressure of between about 100 psig and about 1000 psig.

4. A process according to claim 1 wherein said diene is isoprene.

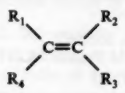
4,078,012

OLEFIN METATHESIS CATALYSTS AND PROCESS UTILIZING SAME

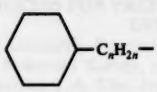
Charles W. Blewett, Ft. Mitchell, Ky., and William R. Garrett, Jr., Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Nov. 22, 1976, Ser. No. 743,935
Int. Cl.[2] C07C *3/62*
U.S. Cl. 260—683 D **8 Claims**

1. A process for metathesizing olefins which comprises contacting an olefin of the general formula



where R_1 is an alkyl group containing from 1 to 40 carbon atoms, a cycloalkyl or alkyl-substituted cycloalkyl group containing 3 to 30 carbon atoms, phenyl, a $C_{1\text{-}20}$ alkyl-substituted phenyl radical or racidal of the formula



where n is an integer from 1 to 20 and R_2, R_3 and R_4 are, independently, hydrogen or a radical as defined for R_1 such that the total number of carbon atoms in the olefin does not exceed about 50, with a homogeneous catalyst at a temperature from about 50° C to about 220° C under substantially anhydrous conditions, said homogeneous catalyst consisting essentially of:

a. tungsten hexachloride;

b. an organotin compound of the formula

where R is an alkyl group containing from 1 to 6 carbon atoms, a cycloalkyl group containing from 3 to 8 carbon atoms, benzyl, phenyl or an alkyl-substituted phenyl group having from 7 to 12 carbon atoms; and

c. a trivalent phosphorus compound,

the molar ratio of (b) to (a) ranging from 0.4:1 to 1.5:1 and the molar ratio of (c) to (a) ranging from 0.1:1 to 0.95:1; said catalyst employed in an amount so that from about 0.0003 to about 0.1 mole tungsten hexachloride is present per mole of the olefin.

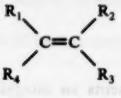
4,078,013

OLEFIN METATHESIS CATALYSTS AND PROCESS UTILIZING SAME

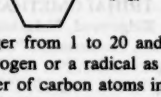
Charles W. Blewett, Ft. Mitchell, Ky., and William R. Garrett, Jr., Cincinnati, Ohio, assignors to Emery Industries, Inc., Cincinnati, Ohio

Filed Nov. 22, 1976, Ser. No. 743,558
Int. Cl.[2] C07C *3/62*
U.S. Cl. 260—683 D **8 Claims**

1. A process for metathesizing olefins which comprises contacting an olefin of the general formula



where R_1 is an alkyl group containing from 1 to 40 carbon atoms, a cycloalkyl or alkyl-substituted cycloalkyl group containing 3 to 20 carbon atoms, phenyl, a $C_{1\text{-}20}$ alkyl-substituted phenyl radical or radical of the formula



where n is an integer from 1 to 20 and R_2, R_3 and R_4 are, independently, hydrogen or a radical as defined for R_1 such that the total number of carbon atoms in the olefin does not exceed about 50, with a homogeneous catalyst at a temperature from about 0° to about 220° C under substantially anhydrous conditions, said homogeneous catalyst consisting essentially of:

a. a tungsten halide or tungsten oxyhalide;

b. an organotin compound of the formula

where R is an alkyl group containing from 1 to 16 carbon atoms, a cycloalkyl group containing from 3 to 8 carbon atoms, benzyl, phenyl or an alkyl-substituted phenyl group having from 7 to 12 carbon atoms; and

c. a nitrogenous modifying agent selected from the group consisting of aliphatic amines, cycloaliphatic amines, aromatic amines and heterocyclic amines wherein the nitrogen is contained in a five- or six-membered ring, the molar ratio of (b) to (a) ranging from 0.4:1 to 1.5:1 and the molar ratio of (c) to (a) ranging from 0.1:1 to 0.95:1, said catalyst employed in an amount so that from about 0.0003 mole to about 0.1 mole of (a) is present per mole of the olefin.

4,078,014
COMPOSITION OF POLYAMIDE, POLYETHYLENE IONOMER COPOLYMER

Howard Warner Starkweather, Jr., Wilmington, and Michael Joseph Mutz, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 10, 1976, Ser. No. 694,646
Int. Cl.[2] C08L *77/00*
U.S. Cl. 260—857 L **9 Claims**

1. A composition which consists essentially of 65 to 89% by weight of crystallizable polyamide, 10 to 30% by weight of polyethylene, and 1 to 20% by weight of a copolymer comprising polymerized units of ethylene and at least one α,β-ethylenically unsaturated carboxylic acid having from 3 to 8 carbon atoms, the copolymer having from 15 to 80% of carboxylic acid groups ionized by neutralization with metal ions selected from the class consisting of zinc, cadmium and lead ions.

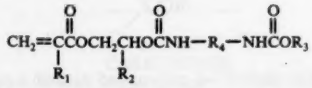
4,078,015
COPOLYMERIZABLE COMPOSITIONS AND METHOD OF MAKING THE SAME

Robert H. Leitheiser, Crystal Lake, Ill., and John J. Szwarc, Saegertown, Pa., assignors to Freeman Chemical Corporation, Port Washington, Wis.

Continuation-in-part of Ser. No. 544,967, Jan. 29, 1975, abandoned, which is a continuation-in-part of Ser. No. 320,685, Jan. 2, 1973, abandoned. This application Dec. 17, 1976, Ser. No. 751,596
Int. Cl.[2] C08G *18/67*
U.S. Cl. 260—859 R **11 Claims**

1. A copolymerizable composition, substantially free of unreacted isocyanate groups, said composition being a liquid at temperatures in the range 50°–120° C and being a solid at room temperature, including

(A) 10 to 50 parts by weight of a polymerizable acrylic diurethane monomer having the general formula



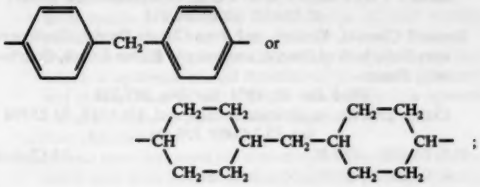
wherein

R_1 is —H or —CH_3;

R_2 is —H, —CH_3 or —C_2H_5;

R_3 is an organic radical constituting the residue of a lower alkyl alcohol R_3OH; and

R_4 is a divalent organic radical



and

(B) 90 to 50 parts by weight of a polymerizable polyacrylic polyurethane monomer which is the reaction product of

(a) an organic diisocyanate $R_4(NCO)_2$;

(b) a beta-hydroxy alkyl ester of an acrylic acid; and

(c) a diol.

4,078,016
HALOGENATED AROMATIC POLYMER/METAL PHOSPHINATE POLYMER FLAME RETARDANT COMPOSITION

Charles E. Kramer, Florham Park, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed May 17, 1976, Ser. No. 686,845
Int. Cl.[2] C08L *67/00, 69/00, 75/04;* **C09K** *3/28*
U.S. Cl. 260—860 **29 Claims**

1. A composition having flame retardant properties comprising

A. a synthetic aromatic polymer containing chlorine, bromine, or mixtures thereof chemically bound to an aromatic ring and

B. an amount sufficient to reduce the flammability of A up to about 20% by weight of A plus B of a linear polymeric metal phosphinate of the recurring structural formula selected from the group consisting of

$$[M(OPRR'O)_m]_n \quad \text{(I)}$$

$$[M'(B)_z(OPRR'O)_m]_n \quad \text{(II)}$$

$$[M''(H_2O)_a(OH)_z(OPRR'O)_q \cdot pH_2O]_n \quad \text{(III)}$$

wherein R and R′ may be the same or different and represent alkyl or aryl radicals, M is a metal selected from the group consisting of Co, Mn, Cr, Ni, Zn, Zr, Ti, and M′ is a member selected from the group consisting of Ti and Zr; B is a member selected from the group consisting of oxo, alkoxy, aryloxy and z equals 1 when B equals oxo, z equals 2 when B equals alkoxy and aryloxy and z equals 0 when m equals 3; M″ is Cr(III); $a+p$ equals 1,q may vary from 1 to 3, c may vary from 0 to 3. m may vary from 1 to 3, and n is at least 10.

4,078,017
PROCESS FOR PRODUCTION OF MODIFIED POLYPROPYLENE

Kikuo Nagatoshi, Kisarazu; Toshimichi Ito, Sodegaura; Atsunobu Sakoda, Sodegaura; Akio Inayoshi, Sodegaura; Noriki Fujimoto, Sodegaura; Hidehiko Kaji, Sodegaura, and Hirozo Sugahara, Sodegaura, all of Japan, assignors to Idemitsu Kosan Company, Ltd., Tokyo, Japan

Filed Mar. 3, 1977, Ser. No. 774,202
Claims priority, application Japan, Mar. 4, 1976, 51-22626
Int. Cl.[2] C08F *255/02*
U.S. Cl. 260—878 R **6 Claims**

1. A process for producing a modified polypropylene which comprises reacting a polypropylene with a liquid rubber and maleic anhydride in a solvent in the presence of a radical generator.

4,078,018
GRAFT POLYMERS AND COMPOSITIONS OF HIGH IMPACT STRENGTH

Bernard Chauvel, Ermont, and Jean-Claude Daniel, Fontenay-sous-Bois, both of France, assignors to Rhone-Progil, Courbevoie, France

Filed Jul. 10, 1974, Ser. No. 487,218
Claims priority, application France, Jul. 11, 1973, 73 25394
Int. Cl.² C08F 279/06
U.S. Cl. 260—880 R 13 Claims

1. Grafted polymers constituted of:

10 to 70% by weight backbone polymer,

which is a copolymer consisting of a butadiene-alkyl acrylate in which the alkyl group contains 1–10 carbon atoms and in which the acrylate represents 5 to 50% by weight of the backbone polymer, and the backbone polymer is agglomerated into particles of 0.1 to 1 micron before grafting, and

90 to 30% by weight of grafts, in which the grafts are formed of:

20 to 80% by weight of an acrylic monomer selected from the group consisting of acrylic or methacrylic derivatives at least 50% of which is methyl methacrylate, and

80 to 20% by weight of a styrene monomer, selected from the group consisting of styrene and vinyl aromatic monomer, at least 50% of which is styrene, and

0 to 5% by weight of at least one cross-linking monomer, and in which the acrylic monomer and styrene monomer are successively grafted onto the backbone polymer in aqueous emulsion.

4,078,019
PROCESS FOR POLYMER LITHIATION IN GRAFT POLYMERIZATION

Arthur W. Langer, Jr., Plainfield, N.J., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation of Ser. No. 309,359, Nov. 24, 1972, abandoned, continuation of Ser. No. 690,054, Dec. 13, 1967, and a continuation-in-part of Ser. No. 886,008, Dec. 17, 1969, and Ser. No. 886,009, Dec. 17, 1969, and a continuation-in-part of Ser. No. 690,076, Dec. 13, 1967, and a continuation-in-part of Ser. No. 61,813, Aug. 6, 1970, and a continuation-in-part of Ser. No. 60,772, Aug. 3, 1970, said Ser. No. 309,359, is a continuation-in-part of Ser. No. 81,181, Oct. 15, 1970, Pat. No. 3,751,384, Ser. No. 828,384, May 16, 1969, Pat. No. 3,536,679, Ser. No. 589,240, Oct. 25, 1966, Pat. No. 3,451,988, and Ser. No. 266,188, Mar. 19, 1963, abandoned, said Ser. No. 690,054, is a continuation-in-part of Ser. No. 560,110, Jun. 24, 1966, abandoned, Ser. No. 505,976, Nov. 1, 1965, abandoned, Ser. No. 359,434, Apr. 3, 1964, Pat. No. 3,458,856, and Ser. No. 266,188, Mar. 19, 1963, said Ser. No. 886,008, and Ser. No. 886,009, each is a division of Ser. No. 690,054, Dec. 13, 1967, said Ser. No. 690,076, is a continuation-in-part of Ser. No. 560,110, Jun. 24, 1966, said Ser. No. 61,813, is a continuation-in-part of Ser. No. 825,384, May 16, 1969. This application Mar. 28, 1975, Ser. No. 562,826
Int. Cl.² C08F 279/02, 289/00
U.S. Cl. 260—880 R 11 Claims

1. A process for preparing graft polymers which comprises contacting an anionically polymerizable monomer with a polymer-Li•tertiary chelating polyamine complex in wich the Li•tertiary chelating polyamine moiety of the complex is attached to carbon atoms of units within the polymer, said units consisting of hydrocarbyl radicals containing allylic or cyclopropyl hydrogen atoms.

4,078,020
THERMOPLASTIC ELASTOMERS COMPRISING ETHYLENE-α-OLEFIN COPOLYMER, POLYPROPYLENE AND POLYBUTENE

Rod A. Rose, Holt, and Andre Fritz, Okemos, both of Mich., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,234
Int. Cl.² C08L 23/12
U.S. Cl. 260—897 A 12 Claims

1. A thermoplastic elastomer composition comprising

a. 20 to 80% by weight of an uncured ethylene-higher α-olefin copolymer, which consists essentially of 60–85% of ethylene and 15–40% of a higher α -olefin,

b. 20 to 60% by weight of crystalline isotactic polypropylene, and

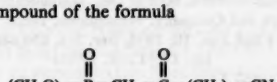
c. 5 to 40% by weight of crystalline isotactic butene-1 homopolymer.

4,078,021
DIMETHYL 2-OXO-6-CYANOHEXYL-PHOSPHONATE

Hans-Jurgen E. Hess, and Thomas K. Schaaf, both of Old Lyme, Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 712,361, Aug. 6, 1976, Pat. No. 4,045,465.
This application Apr. 25, 1977, Ser. No. 790,235
Int. Cl.² C07F 9/40
U.S. Cl. 260—940 1 Claim

1. The compound of the formula



4,078,022
5-NORBORNENE-2-METHYL PHOSPHITES AND PHOSPHATE

Mark Chaoming Chen, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 21, 1976, Ser. No. 698,017
Int. Cl.² C07F 9/117, 9/144; C08K 5/53
U.S. Cl. 260—956 8 Claims

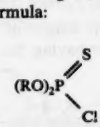
1. Bis(5-norbornene-2-methyl) phosphite.

4,078,023
PRODUCTION OF O,O-DIALKYLTHIONOPHOSPHORIC ACID CHLORIDES

Bernd Lippsmeier; Hilmar Roszinski, both of Knapsack, and Hans-Werner Stephan, Cologne-Klettenberg, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Aug. 24, 1976, Ser. No. 717,086
Claims priority, application Germany, Aug. 28, 1975, 2538310
Int. Cl.² C07F 9/20
U.S. Cl. 260—986 9 Claims

1. In the process for making O,O-dialkythionophosphoric acid chlorides of the formula:



wherein R is alkyl of 1–6 carbons and wherein a suitable O,O-dialkyldithiophosphoric acid is reacted with chlorine and precipitated sulfur is separated from the reaction product, the improvement which comprises chlorinating the dialkyldithiophosphoric acid in two stages, the first stage comprising reacting the acid with chlorine in a molar ratio of said acid to chlorine of 1 : 1.15 to 1 : 1.50 for as long as necessary for the resulting chlorination product to become rendered turbid by

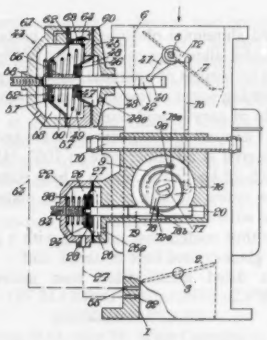
precipitating sulfur, allowing the chlorination product to stand for 15–30 minutes with the resultant formation of two liquid phases the lower of which is sulfur, separating the said sulfur, admixing the remaining liquid phase with a distilled product of a previous batch chlorinated in the second stage and admixing it with a further 0.25 to 0.7 mole of O,O-dialkyldithiophosphoric acid per mole of acid initially used, and distillatively separating desirable final product from said mixture, the second stage comprising reacting the distillation residue of the first stage with a total proportion of 0.9 to 1.0 mole of chlorine per mole of acid initially used, separating precipitated sulfur from the second stage chlorination product, distilling off the liquid phase, and recycling the resulting distillate to the first chlorination stage.

4,078,024

CARBURETOR FOR INTERNAL COMBUSTION ENGINE

Wilfried Bockelmann, Buttgen, and Georg Faltermeier, Wolnzach, both of Germany, assignors to Societe Industrielle de Brevets et d'Etudes S.I.B.E., France

Filed Apr. 5, 1977, Ser. No. 784,696
Claims priority, application France, Apr. 23, 1976, 76 12111
Int. Cl.² F02M *1/10*
U.S. Cl. 261—39 B **6 Claims**



1. A carburettor for internal combustion engine comprising, in an intake pipe, successively, in the direction opposite to that of air flow: operator operable main throttle means actuated by the user; a main fuel jetting system; an auxiliary throttle means urged in the closing direction by thermostatic means sensitive to the engine temperature when the engine temperature is less than a predetermined limit and urged in the opening direction by the air flow inspired by the carburettor and by a pneumatic element subjected to the pressure which prevails in the intake pipe, downstream of the main throttle means at least when said throttle means is in its minimum opening position, and constructed to open the auxiliary throttle means to a predetermined extent, said carburettor further comprising a pneumatic device which is actuatable by the depression downstream of the main throttle means and is operatively associated with the auxiliary throttle means whereby, when the main throttle means is opened while the engine is cold, the pneumatic device urges it in the closing direction with a force which decreases with time.

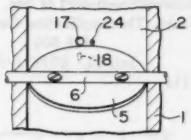
4,078,025

CARBURETOR

Takashi Kato, Susono, Japan, assignor to Yoyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed Oct. 13, 1976, Ser. No. 732,057
Claims priority, application Japan, Jul. 13, 1976, 51/83079
Int. Cl.² F02M *7/06*
U.S. Cl. 261—41 D **4 Claims**

1. A carburetor comprising:
an intake passage including a venturi portion;
a throttle valve provided in said intake passage downstream of said venturi portion;
a main nozzle which opens to the inside of said venturi portion;
a slow port which opens to said intake passage at a position which is upstream of said throttle valve when it is closed and downstream of said throttle valve when it is opened for more than a predetermined opening;
a float chamber;
main and slow fuel passages extending from said float chamber to said main nozzle and to said slow port, respectively; and



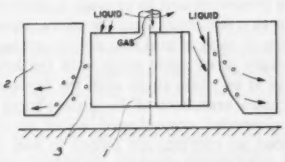
an air port which opens to said intake passage at a position which is upstream of said throttle valve when it is closed and downstream of said throttle valve when it is opened for more than a predetermined opening, said air port having the downstream edge arranged at substantially the same position as the downstream edge of said slow port with respect to the flow direction in said intake passage and an effective upstream edge arranged as displaced to the downstream side from the effective upstream edge of said slow port with respect to the flow direction in said intake passage.

4,078,026

DEVICE FOR DISPERSING GAS INTO A LIQUID

Kai Fallenius, Tapiola, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Continuation of Ser. No. 474,234, May 29, 1974, abandoned.
This application Jun. 23, 1976, Ser. No. 698,900
Claims priority, application Finland, Jun. 5, 1973, 1823/73
Int. Cl.² B01F *3/04*
U.S. Cl. 261—87 **5 Claims**



1. A dispersing device for dispersing a gas into a liquid or slurry, which comprises: a cell for containing the liquid or slurry, a rotor on a hollow rotor shaft rotatable about a vertical axis and disposed in said cell below the level of liquid or slurry, the shaft having means connectable to a source of gas, and the rotor having a dispersion surface essentially constituted by a mantle surface at the periphery of the rotor, blades forming vertical walls over substantially the entire height of the rotor and gas gaps over the entire rotor height communicating with the shaft for bringing the gas to the dispersion surface; a stator comprising vertical vanes disposed within said cell extending radially outwardly with respect to said shaft and surrounding the rotor, said stator defining, together with the rotor, an annular space therebetween for the liquid to be rotated as a ring by the rotor, said stator opposing the rotation of the liquid and causing turbulence in said annular space, said rotor and stator being of substantial height, coextensive over their

heights and so shaped that the annular space therebetween widens downwardly along substantially the whole of the rotor height, the ringshaped body of liquid so formed creating a dynamic pressure and thereby compensating for the hydrostatic pressure across the height of the rotor.

4,078,027

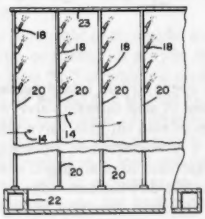
WATER DISTRIBUTION SYSTEM FOR COOLING WATER

Tze-Ning Chen, Princeton, N.J., assignor to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Continuation of Ser. No. 389,811, Aug. 20, 1973, abandoned, which is a continuation-in-part of Ser. No. 162,163, Jul. 13, 1971, abandoned. This application Oct. 29, 1974, Ser. No. 518,506

Int. Cl.[2] B01F *3/04*

U.S. Cl. 261—116 **10 Claims**



1. A water distribution system used as the sole means of inducing the flow of air for cooling water by air flow comprising:

a spray nozzle arrangement on each of at least two sides of a central area, devoid of spray nozzles, each spray nozzle arrangement including spray nozzles mounted along a plurality of separated vertical planes having the central area as a common center and a plurality of separated horizontal planes, with a plurality of separated nozzles mounted along each vertical plane with some of the nozzles being spaced a different distance from the central area than other nozzles, and a plurality of separated nozzles mounted along each horizontal plane with some of the nozzles being spaced a different distance from the central area than other nozzles, the spacings of the spray nozzles being predetermined to provide a uniform distribution of water as it is ejected from the spray nozzles; all the spray nozzles in each of said two nozzle arrangements pointing upwardly at an acute angle with the horizontal to eject sprays at an acute angle with the horizontal and toward the central area, each of the nozzles being adapted to eject an unimpeded cone-shaped water spray, whereby the induced air currents are forced to pass entirely through each spray nozzle arrangement before discharging into the central area; and the air, heated and laden with moisture by the spray from the nozzles escapes vertically at the central area, thereby using the air to its fullest extent, in contacting and cooling the water droplets; and means for supporting and conducting water to the spray nozzles.

4,078,028

METHOD FOR MANUFACTURE OF NONCOMBUSTIBLE, SMOKELESS BUILDING COMPOSITE MATERIAL

Ken Kishi, Tokyo, Japan, assignor to Showa Vermiculite Kabushiki Kaisha, Japan

Filed Sep. 1, 1976, Ser. No. 719,502

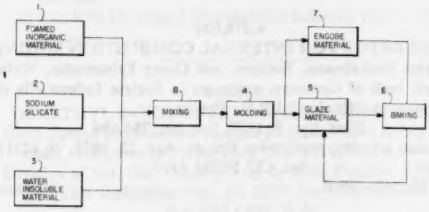
Claims priority, application Japan, Dec. 27, 1975, 50-158150

Int. Cl.[2] B29D *9/06, 27/00*

U.S. Cl. 264—43 **12 Claims**

1. A process for preparing a noncombustible, smokeless composite material which absorbs moisture and is water-insoluble, which process comprises

thoroughly mixing 0.5–1 part by weight of an inorganic adhesive with one part by weight of a foamed inorganic material, wherein the foamed inorganic material is selected from the group consisting of vermiculite, perlite, silas balloon, alumina pulp, carnamite, amosphur, silica balloon, dia balloon, micro balloon and glass micro balloon, and the inorganic adhesive is a mixture of 2–6 parts by weight of sodium silicate and one part by weight of an additive substance selected from the group consisting of (1) lithium silicate, (2) denatured silica sol, (3) aluminum phosphate and (4) a mixture of 1.6 parts by weight of



condensed aluminum phosphate, 104 parts by weight of non-colloidal silica, 4 parts by weight of titanium dioxide, 100 parts by weight of colloidal silica, 0.4 part by weight of gel-forming agent extracted from bentonite and 5 parts by weight of acrylic acid ester,

molding the mixture of inorganic adhesive and foamed inorganic material at a temperature of 105°–145° C and pressure of 3.5–22 kg/cm^2 to obtain a base material,

coating the entire surface of the base material with said inorganic adhesive material,

coating the thus coated base material with a glaze material,

drying the glaze-coated base material, and

baking the dried glaze-coated base material at about 670°–825° C.

4,078,029

PROCESS FOR PREPARING MOLD

Akitoshi Yoshida; Masaharu Kosaka, and Akira Kitajima, all of Funabashi, Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Sep. 23, 1976, Ser. No. 725,946

Int. Cl.[2] C04B *35/64*

U.S. Cl. 264—63 **5 Claims**

1. A process for preparing a mold which comprises preparing a slurry of a refractory powder in a binder solution consisting essentially of silica sol at a mole ratio of SiO_2/M_2O of 10 to 22 and a material selected from the group consisting of monomethyl triethanol ammonium silicate and tetraethanol ammonium silicate at and a mole ratio of SiO_2/NR of 9 to 28 where M represents a metal selected from the group consisting of Li and Na and NR represents a material selected from the group consisting of monomethyl triethanol ammonium hydroxide and tetraethanol ammonium hydroxide, repeatedly coating a suitable pattern and then drying to form a green mold, separating said green mold from said pattern, and calcining said green mold.

4,078,030

MOLDING OF ARTICLES FROM FIBROUS MATERIAL

Edmund E. Munk, and Herbert G. Haas, both of Oberstenfeld, Germany, assignors to Werzalik-Pressholzwerk J.F. Werz Jr. KG, Oberstenfeld, Germany

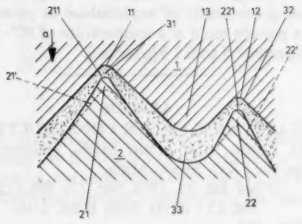
Filed Mar. 13, 1973, Ser. No. 340,934

Int. Cl.[2] B29J *5/00*

U.S. Cl. 264—109 **8 Claims**

1. A method of making shaped articles, particularly decora-

tive articles, provided with depressions and sharp-edged projections, comprising the steps of at least partially confining a mass which includes a fibrous substance admixed with a binder so as to obtain an at least partially confined layer having a first location corresponding to a projection to be formed and a second location adjacent said first location corresponding to a depression to be formed, said layer having a surface extending across said first and second locations; and compressing said layer in a manner to obtain a shaped article which includes a depression corresponding to said second location and a projection corresponding to said first location and which has a sharp



single edge constituting the tip thereof, said compression comprising effecting a deformation of said surface so that one portion thereof defines said edge and another portion thereof defines a surface of said depression, and said compression being performed in such a manner that the degree to which said layer is compressed at said second location suffices to produce at said surface of said depression a substantially non-porous structure while the degree to which said layer is compressed at said first location exceeds that at said second location by an amount sufficient to also produce at said edge of said projection a substantially non-porous structure.

4,078,031

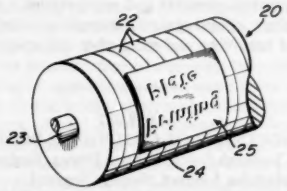
METHOD OF MAKING A MAGNETIC FLEXIBLE PRINTING PLATE

Homer L. Bishop, P.O. Box 35, West Carrollton, Ohio 45449

Continuation-in-part of Ser. No. 452,058, Mar. 18, 1974, abandoned, which is a continuation-in-part of Ser. No. 194,651, Nov. 1, 1971, abandoned, and Ser. No. 290,852, Sep. 21, 1972, Pat. No. 3,837,959. This application Jun. 18, 1976, Ser. No. 697,386

Int. Cl.[2] B29C *5/12, 17/10;* **B29D** *9/00*

U.S. Cl. 264—163 **4 Claims**



1. An improved method of making a flexible printing plate adapted to be mounted on a magnetic cylinder of a printing press, comprising the steps of mixing a ferrous metal powder within a liquid vinyl material to form a mixture, forming a face layer of at least partially cured vinyl material substantially free of the ferrous metal powder, casting the mixture onto the face layer of at least partially cured vinyl material to form a base layer of gnerally uniform thickness, heating the base layer with the face layer to fuse the layers into a multi-layer mold sheet of substantially uniform thickness, placing the face layer of the mold sheet into contact with a porous printing plate mold having a substantially uniform thickness and a recessed impression, heating the assembly of the mold sheet and the printing plate mold, placing the heated assembly into a press having a fluid actuated diaphragm, pressurizing the diaphragm with uniform fluid pressure for pressing the face layer of the mold sheet into the recessed impression to form a printing plate having a rasied printing surface corresponding to the impression, allowing the assembly to cool while the mold sheet is being pressed against the printing plate mold, reforming the base layer including the ferrous metal powder to provide the printing plate with a precisely uniform caliper, and stripping the printing plate from the printing plate mold.

4,078,032

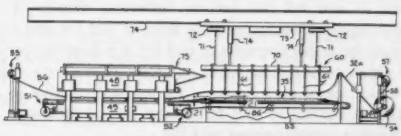
METHOD AND APPARATUS FOR FABRICATING A CONTINUOUS LENGTH OF CLEATED BELTING

Ralph B. Wenner, 2808 Westchester Rd., Toledo, OhioIO 43615

Filed May 2, 1977, Ser. No. 792,775

Int. Cl.[2] B29H *5/01, 7/22;* **B29C** *3/02*

U.S. Cl. 264—167 **12 Claims**



1. A method for fabricating a continuous length of cleated belting, said method comprising the steps of

(a) positioning a plurality of elongated uncured cleats with their upper edges downwardly in complementary longitudinally spaced recesses in a moveable mold, such recesses extending generally laterally of the length of the belting being fabricated,

(b) feeding a length of continuous belting base material from a supply forwardly over the mold and through between spaced heated press platens,

(c) moving the mold and the base material concommitantly forwardly into position between the press platens,

(d) closing the press platens and curing the cleats to the section of the base material that overlies the cleats,

(e) opening the press platens,

(f) moving the mold and the entire length of the base material including the cured section backwardly until the cured section is removed from between the press platens,

(g) lifting the cured section upwardly for removing the cured cleats from the mold recesses,

(h) positioning additional uncured cleats in all of the mold recesses except the first recess at the front of the moveable mold,

(i) feeding the entire length of the base material including the cured section forwardly over and beyond the mold while progressively lowering the cured section downwardly toward the mold level and holding the mold stationary until the last cured cleat reaches a position overlying the first recess,

(j) fitting the last cured cleat into the first recess,

(k) moving the mold and the entire length of the base material forwardly through the space between the platens until the mold is positioned therebetween, and

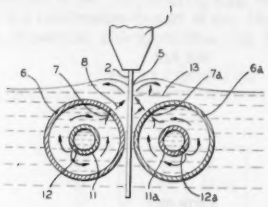
(l) serially repeating steps (d) through (k) until a desired length of continuous cleated belting has been fabricated.

4,078,033

PROCESSES AND APPARATUS FOR LIQUID BATH COOLING OF EXTRUDED FOILS

Dieter Czerwon, Huckeswagen-Wiehagen; Friedrich Rüppel, Wuppertal-Langerfeld, and Siegfried Braun, Wipperfurth, all of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengellschaft, Wuppertal, Germany

Filed Jan. 29, 1976, Ser. No. 653,473
Claims priority, application Germany, Feb. 6, 1975, 2504970
Int. Cl.² D01D *3/00, 5/08*
U.S. Cl. 264—178 R 6 Claims



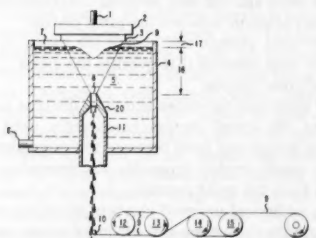
1. A process for cooling a planar freshly extruded, incompletely solidified foil of a thermoplastic polymer which comprises extruding said planar foil into a liquid cooling bath, and directing simultaneously against said foil below but near the bath surface along a line of incidence extending the entire width of said foil two narrow, unbroken streams of cooling liquid against directly opposite sides of said foil and angularly against the respective sides of said foil in a direction opposite to the direction of movement of said foil into said bath at an angle of incidence of each between 15° and 45° relative to a plane which is normal to said foil at the line of incidence of said respective stream against said foil.

4,078,034

AIR GAGE SPINNING PROCESS

Gary Brett Lewis, Richmond, Va., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 21, 1976, Ser. No. 752,915
Int. Cl.² D01D *5/14*
U.S. Cl. 264—181 6 Claims



1. A process for spinning a solution of an aromatic polyamide downwardly through a noncoagulating fluid into a liquid coagulating bath and subsequently through a spin tube containing freshly spun filaments and coagulating liquid at a spinning speed of at least 300 mpm wherein the freshly spun filaments and coagulating liquid are abruptly deflected away from the walls of the spin tube a distance of 0.025 to 0.15 times the inside diameter of the spin tube, the deflection being at the entrance of the spin tube or at a point no further from the entrance than the filaments will travel in 0.002 seconds at the spinning speed being used.

4,078,035

METHOD FOR MAKING DISPOSABLE MODEL FOR PRECISION INVESTMENT CASTING

Ken Ugata, Nara; Yasuji Morita, Kobe; Yasuharu Mine, Osaka, and Hiroshi Izaki, Kashiwara, all of Japan, assignors to Kubota, Ltd., Osaka, Japan

Continuation of Ser. No. 506,774, Sep. 17, 1974, abandoned.
This application Aug. 5, 1976, Ser. No. 712,067
Claims priority, application Japan, Sep. 20, 1973, 48/107369
Int. Cl.² B29C *1/08, 5/00*
U.S. Cl. 264—221 3 Claims

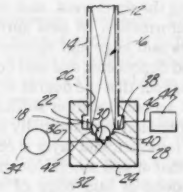
1. A method for making a disposable model for a precision investment casting, which comprises casting a modeling material consisting essentially of naphthalene or para-dichlorobenzene into a pattern mold at a temperature of 80°–150° C and at a casting speed of 5 to 0.1 kg/second.

4,078,036

CARTRIDGE FILTER CONSTRUCTION

Richard D. Keefer, Ann Arbor, Mich., assignor to Pittsfield Products, Inc., Ann Arbor, Mich.

Filed Jul. 24, 1975, Ser. No. 598,672
Int. Cl.² B29D *3/00;* B29C *5/00*
U.S. Cl. 264—261 5 Claims



1. A method for constructing a sealable end cap on a cartridge filter of the type having a support member defining the shape of the cartridge filter and having filter media contained by the support member, said method comprising the steps of: placing an elastomeric seal ring in a first annular groove in a wall defining a mold cavity in a flexible elastomeric mold having an open top, said cavity being adapted to receive a filter support portion, said mold also having a smaller second annular groove in the bottom of said first annular groove communicating with vacuum means; evacuating said second annular groove to retain said seal ring in place in said first groove; inserting said support member portion into said cavity through said open top; filling said mold cavity with molten thermosetting epoxy material so that said epoxy material sealingly engages said support member and encapsulates a portion of the outer periphery of said seal ring extending outside of said first groove; and removing said mold after said epoxy material has hardened.

4,078,037

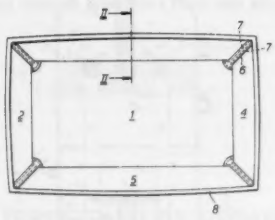
PRODUCTION OF COMPOSITE PRODUCTS

Brian Leo Chudleigh Sutch, Thames Ditton, England, assignor to Airfix Industries Limited, Surrey, England

Filed Dec. 10, 1976, Ser. No. 749,339
Int. Cl.² B29D *9/00;* B29G *3/00*
U.S. Cl. 264—266 2 Claims

1. A method of making a polygonal container by forming an injection moulding on a flexible blank, the method comprising forming a blank having a polygonal base panel along each edge of which is a fold line by which is secured to the base panel a side panel, folding each side panel relative to the base panel along the fold line to shape the blank to the shape of the container and with the adjacent edges of the side panels juxtaposed, clamping the shaped blank between mould tools, injecting material into mould cavity means defined by the tools to seam the juxtaposed edges of the blank side panels and to form

on the free edges of the side panels remote from the base panel a peripheral lip portion interconnecting the moulded seams, the tools in clamping the blank deforming the free edge of each side panel remote from the edge of that panel at the fold line to an internally concave configuration between adjacent seams



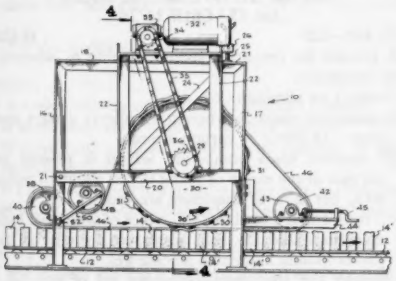
formed at the juxtaposed edges whereby shrinkage of the moulded lip along any free edge will accentuate the concavity of the lip formed on that edge while the region of the side panel adjacent the base panel remains positioned by the base panel at the fold line.

4,078,038

METHOD AND APPARATUS FOR FABRICATING IRREGULAR SHAPED BRICK

Lucius C. Gresham, Jr., Henderson, Tex., assignor to Henderson Clay Products, Inc., Henderson, Tex.

Filed May 6, 1976, Ser. No. 683,803
Int. Cl.[2] B28B *11/08*
U.S. Cl. 264—293 **9 Claims**



1. A method of forming brick or the like of irregular configuration having a handmade appearance, said method comprising the steps of conveying an array of unfired green bricks along a feed path so that the bricks have an upwardly facing surface, moving the upwardly facing surfaces of said bricks into contact with the lower surface of a moving flat-surfaced sheet member moving at approximately the same speed and in the same direction as said bricks, applying localized force through discrete portions of said moving flat-surfaced flexible sheet member to press said discrete portions bulgingly downward into and against bricks adjacent thereto to effect a permanent deformation of said bricks while maintaining other portions of said sheet member in contact with said brick to prevent any change in the geometric array of said bricks during such deformation.

4. A method of forming brick or the like of irregular configuration having an irregular handmade appearance, said method comprising the steps of conveying an array of green pliable uncured bricks along a feed path so that bricks have an upwardly facing surface generally planar vertical side surfaces and are spaced apart from each other, moving said upwardly facing surface of said bricks into contact with a movable flexible sheet member moving at approximately the same speed and in the same direction as said bricks, deflecting portions of said flexible sheet member downwardly to press portions of said flexible sheet member into and against said bricks to effect a deformation of said upwardly facing surfaces and said vertical side surfaces while maintaining the relative positions of the bricks.

4,078,039

CHLORINATION OF TITANIUM SLAGS

Michel Gueguin, Tracy, Canada, assignor to Quebec Iron and Titanium Corporation - Fer et Titane du Quebec, Inc., Sorel, Canada

Continuation of Ser. No. 616,249, Sep. 24, 1975, abandoned. This application Feb. 15, 1977, Ser. No. 768,826
Int. Cl.[2] C01G *23/02*
U.S. Cl. 423—74 **5 Claims**

1. A process for recovery of titanium as titanium tetrachloride from slage produced from electrosmelting or smelting of relatively low content titanium bearing material in the presence of carbonaceous material comprising the steps of:

(a) maintaining a fluidized bed of particulates of said titanium slags of titanium bearing material including said carbonaceous material also as particulates, and further, iron, aluminum as constituent part of the particulates of titanium slag and titanium bearing material, and as impurities in the slage and titanium bearing material, silica, alumina, chromium oxides, vanadium oxides, manganese oxides, calcium oxide, magnesium oxide, and alakli metals;

(b) feeding said fluidized bed with said slags of titanium bearing material as particulates and, as a reactant therewith for a reaction taking place in-situ in said particulate, chlorine;

(c) monitoring and adjusting the content of impurities in said slags of titanium bearing materials in a ratio whereby each of Fe/M, Al/M, or Fe + 0.6 Al/M is equal to about 2, where M is a divalent metal and is an impurity and M is primarily manganese, magnesium, or calcium, said ratio being monitored in said particulates, and being adjusted in a feed particulate according to said ratios above for said Fe/M, Al/M or Fe + 0.6 Al/M content thereof so as to be equal to about 2 when feeding the particulate material into said fluidized bed;

(d) chlorinating said slag or titanium bearing material as particulates in said fluidized bed at 900° C to 1050° C while maintaining said bed in a fluidized condition, said chlorination taking place in-situ in said particulate;

(e) volatilizing said impurities from each of said particulates; and

(f) recovering said titanium tetrachloride substantially free of said impurities.

4,078,040

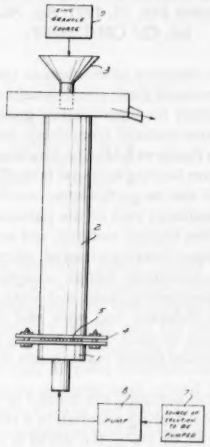
METHOD OF EMPLOYING ELEMENTAL ZINC FOR THE PURIFICATION OF AQUEOUS SOLUTIONS OF METALLIC SALTS

Angel Dimitrov Milkov; Miladin Ivanov Kolarov; Nikola Tzanov Kunchev, all of Plovdiv; Iliya Marinov Iliev, Kardjali; Kostadin Stankov Spassov, Kardjali, and Georgi Stoykov Buyukliev, Kardjali, all of Bulgaria, assignors to Nipki po Tzvetna Metalurgia, Plovdiv, Bulgaria

Continuation-in-part of Ser. No. 532,189, Dec. 12, 1974, abandoned. This application Sep. 27, 1976, Ser. No. 726,492
Claims priority, application Bulgaria, Dec. 12, 1973, 25224
Int. Cl.[2] C01G *9/06*
U.S. Cl. 423—102 **2 Claims**

1. In a method of purifying an impure zinc sulfate solution containing impurities that consist of metallic sulfate salts of copper and cadmium, wherein the solution is contacted with elemental zinc particles at a temperature effective to cause the zinc to react with the solution so that the copper and cadmiu precipitates as a cake on the surface of the zinc particles, tl improvement which comprises the steps of substantially filling a single vertically disposed cylindrical reaction chamber with a fixedly grid supported bed of zinc granules to a height of

greater than 6m, the quantity of zinc granules being chosen to establish a ratio of about 1000 units of the zinc granules to 1 unit of the cake; imparting a continuous turbulent motion to the zinc granules uniformly throughout the height of the cylindrical reaction chamber by contacting the turbulent zinc granules with the solution by flowing the solution upwardly through the turbulent column and out of the chamber in one pass at a velocity in the range of 0.08–0.5 m/sec. so that, because of such turbulence, high frictional forces between the granules and the solution, between the granules and the wall of



the reaction chamber and between the granules themselves are generated which instantly separate, from all of the zinc granules, the cake of copper and cadmium precipitated on the surface of the zinc granules, whereby the surfaces of the zinc granules are renewed in situ for further reaction and whereby the upward flow of the purified solution out of the chamber is effective to carry the separated cake out of the chamber with it, and thereafter leaving the purified solution to settle for about two minutes to separate out the cake from the thus purified solution.

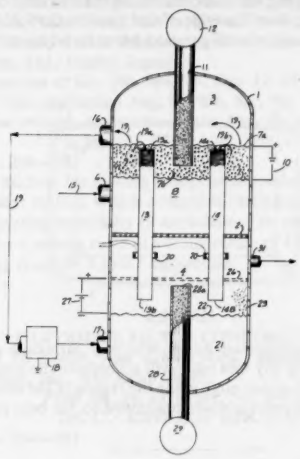
4,078,041

ELECTROFLUIDIZED BED GAS PURIFICATION ARRANGEMENT AND METHOD

John M. Morris, Louisville, Ky., assignor to Rexnord Inc., Racine, Wis.

Filed Mar. 1, 1976, Ser. No. 662,596
Int. Cl.[2] B01D *53/34*
U.S. Cl. 423—210 **9 Claims**

1. A chemically reactive electrofluidized bed gas purification method for cleaning a dirty gas stream with entrained chemically reactive components and particulate materials including: imposing a selected electrostatic charge upon said particulate materials entrained in said dirty gas stream; contacting said dirty gas stream with at least one electrofluidized bed of selected particulate treating material including reagent material of selected chemical composition receptive to combination with said chemically reactive components of said dirty gas stream; and passing said dirty gas stream through at least one second electrofluidized bed of said particulate treating material where electrostatic charge is imposed on the particles of said second fluidized bed of particulate treating material so said electrically charged particulate matter entrained in said dirty gas stream adheres to the particules of said second fluid-



ized bed which acts as electrostatic collection sites for the particulate material entrained in said dirty gas stream.

4,078,042

PROCESS FOR PREPARING ZEOLITE A

Bruce E. Leach, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Apr. 21, 1977, Ser. No. 789,389
Int. Cl.[2] C01B *33/28*
U.S. Cl. 423—329 **15 Claims**

1. A process for preparing sodium Zeolite A, wherein the process comprises:

(a) forming an admixture of

(i) aluminum alkoxide wherein the alkoxy groups contain from 1 to about 20 carbon atoms,

(ii) reactive silica compound which is present in an amount in the range of about 0.7 to about 10 moles, as SiO_2, per mole of aluminum alkoxide,

(iii) from about 3 to about 100 moles of water per mole of aluminum alkoxide, said admixture forming an amorphous sodium aluminum silicate gel,

(b) heating the admixture-containing gel of step (a) at a temperature in the range of about 70° to about 120° C. until substantially all of it is converted to sodium Zeolite A, and

(c) recovering the sodium Zeolite A,

said process being characterized further in that said reactive silica compound is water soluble and is one or more sodium salts of silicic acids containing at least an average of one sodium atom per silicon atom.

4,078,043

PROCESS FOR PREPARING CALCIUM FLUORIDE FROM HEXAFLUORO SILICIC ACID AND PRODUCTION OF SILICIC ACID GEL OR ACTIVE SILICIC ACID FROM SAID CALCIUM FLUORIDE

Wilfried Becher, Heilbronn-Neckargartach, and Joachim Massonne, Hannover, both of Germany, assignors to Kali-Chemie Aktiengesellschaft, Hannover, Germany

Division of Ser. No. 550,135, Feb. 14, 1975, Pat. No. 4,031,193.
This application Dec. 15, 1976, Ser. No. 750,624
Claims priority, application Germany, Feb. 15, 1974, 2407238
Int. Cl.[2] C01F *11/22*; C01B *33/14, 33/16, 7/22*
U.S. Cl. 423—335 **13 Claims**

1. A process for the production of calcium fluoride, comprising the steps of reacting hexafluorosilicic acid having a con-

centration of between 10 to about 40% by weight with calcium carbonate in the presence of aluminum ion in a molar ratio of aluminum to hexafluorosilicic acid of between about 1:7 and 1:100 at a pH between about 2 and 6, whereby the aluminum ion provides for the formation of an easily separable mixture of calcium fluoride precipitate and aqueous silica sol, and separating said calcium fluoride precipitate from said silica sol.

4,078,044

PROCESS FOR THE CATALYTIC OXIDATION OF AMMONIA AND METHANE TO HYDROGEN CYANIDE

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 556,670, Mar. 10, 1965, Pat. No. 3,976,599, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,885,020. This application Aug. 5, 1976, Ser. No. 712,003

Int. Cl.² C01C *3/02*

U.S. Cl. 423—376 **1 Claim**

1. A process for the oxidation of ammonia to hydrogen cyanide which comprises:

combining ammonia with a predetermined amount of oxygen and methane to produce hydrogen cyanide and water; and

passing the resulting mixture over a ceramic catalyst of the following empirical formula at a temperature between about 700° and 1100° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m')}$$

wherein:

W is zirconium, tin or thorium or mixture thereof;

X is an alkaline earth metal or mixture thereof;

J is scandium, yttrium, a rare-earth element or mixture thereof;

Z is a metal of the first transition series or a mixture thereof, at least 0.01 of said metal having an oxidation state other than +3;

k is a number having a value of between 0 and about 0.1;

m' is a number having a value of from 0 to about 0.26, provided m' has a value other than 0 when n has a value of 0; and

n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value of between 0 and about 0.05.

4,078,045

PROCESS FOR PRODUCING CARBONYL SULFIDE

Yoshiki Nakayama, Shimizu; Hironobu Sano, Fuji; Sataro Okamura, and Kazunari Hirao, both of Shizuoka, all of Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

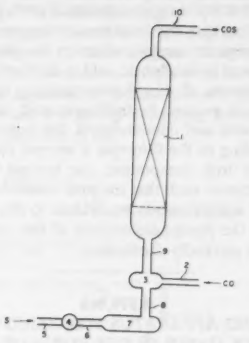
Filed Oct. 28, 1976, Ser. No. 736,334

Claims priority, application Japan, Apr. 28, 1976, 51-48944

Int. Cl.² C01B *31/26*

U.S. Cl. 423—416 **6 Claims**

1. A process for producing carbonyl sulfide which comprises reacting carbon monoxide with sulfur at a temperature of from 250°–450° C in the presence of a catalyst comprising an alkaline earth metal compound selected from the group consisting of calcium, strontium and barium sulfides, sulfates and halides.



4,078,046

PROCESS FOR THE CATALYTIC OXIDATION OF CARBON MONOXIDE WITH SULFUR DIOXIDE AND WATER

James M. Whelan, La Canada, Calif., assignor to University of Southern California, Los Angeles, Calif.

Division of Ser. No. 556,670, Mar. 10, 1965, Pat. No. 3,976,599, which is a division of Ser. No. 194,769, Oct. 8, 1971, Pat. No. 3,885,020. This application Aug. 5, 1976, Ser. No. 711,998

Int. Cl.² C01B *31/20;* **B01D** *53/34*

U.S. Cl. 423—437 **1 Claim**

1. A process for the oxidation of carbon monoxide to carbon dioxide with sulfur dioxide and water which comprises:

combining the carbon monoxide with a predetermined amount of sulfur dioxide and water to produce hydrogen sulfide and carbon dioxide; and

passing the resulting mixture over a ceramic catalyst of the following empirical formula above about 200° C.:

$$W_kX_nJ_{(1-k-n)}ZO_{(3\pm m')}$$

wherein:

W is zirconium, tin or thorium or mixture thereof;

X is an alkaline earth metal or mixture thereof;

J is scandium, yttrium, a rare-earth element or mixture thereof;

Z is a metal of the first transition series or a mixture thereof, at least 0.01% of said metal having an oxidation state other than +3;

k is a number having a value of between 0 and about 1.0;

m' is a number having a value of from 0 to about 0.26, provided m' has a value other than 0 when n has a value of 0; and

n is a number having a value from 0 to about 0.51, provided when n has a value of 0, k has a value of between 0 and about 0.05.

4,078,047

PRODUCTION OF HYDROFLUORIC ACID FROM PHOSPHATE-CONTAINING FLUORSPAR

Bernhard Spreckelmeyer, Johannesburg, South Africa, assignor to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Dec. 30, 1976, Ser. No. 755,902

Claims priority, application Germany, Jan. 17, 1976, 2601654

Int. Cl.² C01B *7/22;* **C01F** *11/46*

U.S. Cl. 423—485 **2 Claims**

1. In the reaction of phosphate containing fluorspar with with an acid to produce gaseous hydrofluoric acid, withdrawing the hydrofluoric acid and condensing it, the improvement

which comprises adding to the fluorspar a reactive iron compound comprising at least one member selected from the group consisting of an iron oxide, iron fluoride and iron sulphate in about 0.2 to 5% by weight calculated as Fe_2O_3 content and based on the fluorspar and in an amount approximately equivalent to the phosphate content whereby the phosphate content of the condensed hydrofluoric acid is markedly diminished.

2. In the reaction of phosphate containing fluorspar with an acid to produce gaseous hydrofluoric acid, withdrawing the hydrofluoric acid and condensing it, the improvement which comprises adding to the fluorspar a second fluorspar containing a reactive iron component, the second fluorspar being added in an amount such that the total amount of reactive iron component is approximately equivalent to the phosphate content whereby the phosphate content of the condensed hydrofluoric acid is markedly diminished.

4,078,048
PROCESS AND APPARATUS FOR REMOVING SULFUR FROM STACK GASES IN THE FORM OF ELEMENTAL SULFUR

Ravindra M. Nadkarni, Arlington, Mass., assignor to Combustion Equipment Associates, Inc., New York, N.Y.

Filed Feb. 16, 1977, Ser. No. 769,169
Int. Cl.² C01B *17/04*
U.S. Cl. 423—571 **38 Claims**

1. A process for removing sulfur dioxide in the form of elemental sulfur from gases, comprising the steps of

a. contacting gases containing sulfur dioxide with a scrubbing liquid comprising an aqueous solution of an ammonium or alkali metal compound having an alkaline pH thereby to form an aqueous spent scrubbing liquid containing ammonium or alkali metal sulfite/sulfate salts, the pH of said aqueous spent scrubbing liquid being no lower than about 6;

b. reacting said sulfite/sulfate salts in said aqueous spent scrubbing liquid with an aqueous solution of barium sulfide, the solids concentration of which is below saturation at the temperature of said reacting step, thereby to precipitate insoluble barium salts and form ammonium or alkali metal sulfide/bisulfide in solution without the evolution of gaseous H_2S;

c. removing said insoluble barium salts from said solution of said sulfide/bisulfide;

d. oxidizing said sulfide/bisulfide solution using as an oxidation catalyst a source of water-soluble polyvalent metal ions dissolved in said solution to precipitate elemental sulfur directly from said solution and to regenerate ammonium or alkali metal compound in solution for recycling as said scrubbing liquid; and

e. separating said elemental sulfur from said compound in solution.

4,078,049
ACETYLCHOLINE ASSAY

Arthur Martin Felix, West Caldwell, and Sidney Spector, Livingston, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 28, 1977, Ser. No. 773,024
Int. Cl.² G01N *33/16*; A61K *39/00, 43/00*
U.S. Cl. 424—1 **7 Claims**

1. An antigen consisting essentially of a hapten, 6-aminocaproic acid (2-trimethylaminoethyl) ester and acid addition salts thereof, covalently bonded to an immunogenic carrier material through peptide bonds formed between said 6-amino group and carboxyl groups on said immunogenic carrier material.

6. A method for the assay of acetylcholine in a sample, which method comprises mixing said sample with a known amount of labelled acetylcholine and an antibody which will selectively complex with acetylcholine, measuring the degree of binding of said labelled acetylcholine compound with said antibody, and determining the amount of acetylcholine present in said sample by comparing said degree of binding to a standard curve obtained by mixing known amounts of acetylcholine with fixed amounts of said labelled acetylcholine and said antibody and determining the degree of binding for each known amount of acetylcholine.

4,078,050
DEODORANT COMPOSITIONS AND PROCESS OF DEODORIZING USING 2,4-DISUBSTITUTED 6-HYDROXY-1,3-DIOXANE COMPOUNDS

Una L. Hart, 1750 Summit Ave., Saint Paul, Minn. 55105

Continuation-in-part of Ser. No. 527,623, Nov. 27, 1974, abandoned, which is a continuation-in-part of Ser. No. 410,241, Oct. 29, 1973, Pat. No. 3,903,259, and a continuation-in-part of Ser. No. 104,769, Jan. 7, 1971, abandoned, which is a continuation-in-part of Ser. No. 782,474, Dec. 9, 1968, abandoned. This application Jul. 6, 1976, Ser. No. 702,905
Int. Cl.² A61L *13/00*; A01N *9/28*
U.S. Cl. 424—76 **15 Claims**

1. A process for neutralizing offensive odors of animal origin which comprises applying to the odor-containing area, in an amount effective to neutralize the offensive odors, a 2, 4-disubstituted 6-hydroxy-1, 3-dioxane compound, in which the substituent group in each of the 2 and 4 positions is a lower alkyl or aryl group and said compound being decomposable with liberation of aldehyde under ordinary conditions of use as a deodorant.

4,078,051
CROSS-LINKED STARCH COATED ANTIPERSPIRANT DERIVATIVE OF ALUMINUM, PROCESS FOR ITS PREPARATION AND ANTIPERSPIRANT COMPOSITION CONTAINING SAME

Jean Pomot, Mouans Sartoux, and Jean-Philippe Chalaye, Maisons-Alfort, both of France, assignors to L'Oreal, Paris, France

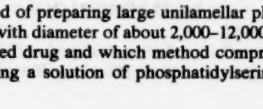
Continuation-in-part of Ser. No. 438,946, Feb. 1, 1974, abandoned. This application Oct. 3, 1975, Ser. No. 619,475
Claims priority, application Luxembourg, Feb. 5, 1973, 66959
Int. Cl.² A61K *9/62, 7/38*
U.S. Cl. 424—35 **17 Claims**

1. In an antiperspirant agent consisting of coated microcrystals of an antiperspirant derivative of aluminum selected from the group consisting of basic aluminum hydrochloride and basic aluminum hydrobromide the improvement comprising, as the coating for said antiperspirant derivative of aluminum, starch partially crosslinked by etherification, wherein said partially crosslinked starch contains about one crosslink per 100 to 2000 glucose units present in said starch and wherein the weight ratio of said antiperspirant derivative of aluminum to starch (dry basis) is between 1:10 and 1:1, so as to provide a delayed antiperspirant effect.

4,078,052
LARGE UNILAMELLAR VESICLES (LUV) AND METHOD OF PREPARING SAME

P. Demetrios Papahadjopoulos, Buffalo, N.Y., assignor to The United States of America as represented by the Secretary of Health, Education and Welfare, Washington, D.C.

Filed Jun. 30, 1976, Ser. No. 701,190
Int. Cl.² A61K *9/64*
U.S. Cl. 424—36 **17 Claims**



6. A method of preparing large unilamellar phosphatidylserine vesicles with diameter of about 2,000–12,000 A containing an encapsulated drug and which method comprises:

(1) subjecting a solution of phosphatidylserine in aqueous

NaCl buffer to ultrasound treatment to give a sonicated preparation of said phosphatidylserine containing small spheroidal vesicles in the range of 200–500 A diameter;

(2) adding an effective amount of a drug to the solution of phosphatidylserine for encapsulation;

(3) adding Ca^{2+} in the amount of 1–10 mM and incubating for about 30 minutes to 1 hour at room temperature above 10° C to produce large multilamellar structures, a substantial portion of which are cochleate cylinders;

(4) adding a chelating agent for Ca^{2+} at a pH of about 7.4 in an amount sufficient to chelate surplus calcium to produce the desired large closed spherical unilamellar phosphatidylserine vesicles.

17. A large unilamellar phosphatidylserine vesicle product produced according to the method of claim 6.

4,078,053
HIGH-CONCENTRATION FLUORIDE PREPARATIONS AND USE FOR PREVENTING CARIES

Paul F. DePaola, Lexington, Mass., assignor to Forsyth Dental Infirmary for Children, Boston, Mass.

Filed Feb. 20, 1976, Ser. No. 659,833
Int. Cl.² A61K *7/18*
U.S. Cl. 424—52 **14 Claims**

1. A method for the prevention of caries in newly erupted teeth of a subject, which method comprises contacting the newly erupted teeth in the oral cavity daily about four to seven times a week with a composition containing a high concentration of from 500 to 3000 ppm of ammonium fluoride.

4,078,054
SUN SCREEN COMPOSITIONS OF UNSATURATED ESTERS OF P-DIMETHYLAMINOBENZOIC ACID

Howard P. Isermann, West Orange, and Joseph P. Ciaudelli, Ramsey, both of N.J., assignors to Van Dyk & Company, Incorporated, Belleville, N.J.

Filed Aug. 17, 1976, Ser. No. 715,064
Int. Cl.² A61K *7/44*; C07C *101/62*
U.S. Cl. 424—60 **8 Claims**

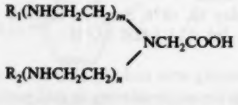
1. A composition adapted for application to the human skin comprising a cosmetic oil carrier containing distributed therein from an effective amount to provide substantial protection against erythemal radiation up to the limit of solubility therein of an ester of an unsaturated monohydric alcohol, having from 3 to 10 carbon atoms, of p-dimethylaminobenzoic acid, said ester having a sufficiently low melting point as to be liquid at skin temperatures, and being miscible in said carrier at said temperatures.

4,078,055
DEODORIZING AND SMELL-REMOVING COMPOSITION AND METHOD OF USING SAME

Yoshinori Naganuma, Hoya, and Haruhiko Arai, Narashino, both of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Mar. 26, 1976, Ser. No. 670,735
Claims priority, application Japan, Apr. 11, 1975, 50-44101
Int. Cl.² A61K *13/00*
U.S. Cl. 424—76 **10 Claims**

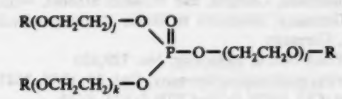
1. A composition for deodorizing odoriferous materials and objects characterized by having one or more of mercaptans, hydrogen sulfide and ammonia as a bad-smelling component, which consists essentially of a mixture of from 0.01 to 5 weight percent of a glycine type amphoteric surface active agent having the formula (I):



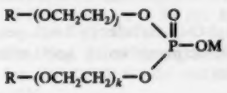
(I)

wherein R_1 is alkyl having 6 to 18 carbon atoms, R_2 is hydrogen or alkyl having 6 to 18 carbon atoms, m is an integer of 1 to 5, and n is zero or an integer of 1 to 5,

or organic or inorganic acid salts of said surface active agent, from 0.01 to 5 weight percent of an adduct of from 1 to 300 moles of ethylene oxide to castor oil, an adduct of from 1 to 300 moles of ethylene oxide to hydrogenated castor oil or an adduct of from 1 to 300 moles of ethylene oxide to lanolin; from 0.01 to 5 weight percent of at least one phosphoric acid ester salt selected from the group consisting of salts having the formulae (II), (III) and (IV):

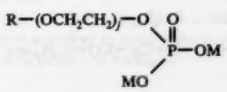


(II),



(III)

and



(IV)

wherein R is alkyl or alkenyl having 8 to 22 carbon atoms, j, k and l each are zero or an integer of 1 to 40, and M is a cation selected from the group consisting of alkali metal, ammonia and alkylolamine,

and the balance of the composition consists essentially of an inert carrier or diluent substance.

4,078,056
ANTIBIOTIC COMPLEX FROM MICROMONOSPORA ARBORENSIS

Marvin J. Weinstein; Gerald H. Wagman, both of East Brunswick; Joseph A. Marquez, Montclair, and Raymond T. Testa, Verona, all of N.J., assignors to Schering Corporation, Kenilworth, N.J.

Continuation-in-part of Ser. No. 516,242, Oct. 18, 1974, abandoned. This application Feb. 2, 1976, Ser. No. 654,327
Int. Cl.² A61K *35/74*
U.S. Cl. 424—117 **6 Claims**

5. Antibiotic 68-1147 I, a compound which:

a. is effective in inhibiting the growth of various bacteria, especially Gram positive bacteria;

b. has an optical rotation $[\alpha]_D^{26°} = -87.5°$ (C,0.4%, dioxane)

c. has a characteristic ultraviolet absorption spectrum in trifluoroethanol as follows:

λ max	$E^{1\%}_{cm}$
202 mμ	53.55
247	32.55
308	10.72

d. has the following elemental analysis: C, 49.46; H, 5.20; N, 14.88; O, 16.18; S, 10.47;

e. has a melting point of 229°– 231° C dec.

f. has a characteristic infrared absorption spectrum in mineral oil (Nujol) with absorption at:

3.05 m,sp	7.30 m,sp	9.75 w,sp
3.45 s,sp	7.45 sh	9.95 sh
5.78 w,sp	7.65 w,sp	10.58 w,br
6.08 s	8.30 w,sp	10.70 w,br
6.31 w,sp	9.00 w,sp	11.20 w,br
6.60 s	9.15 w,br	11.30 sh
6.65 s	9.50 w,br	11.90 microns w,br
6.75 s	9.40 w,br	

g. contains the following aminoacids: threonine, proline, alanine, cysteine, isoluecine and tyrosine.

4,078,057

O-ALKYL-O-(1-CARBALKOXY-2-TERT.-PENTYRYL-VINYL)-(THIONO) (THIOL) PHOSPHORIC (PHOSPHONIC) ACID ESTERS, ESTER-AMIDES AND METHOD OF COMBATTING INSECTS

Fritz Maurer; Hans-Jochem Riebel, both of Wuppertal; Bernhard Homeyer, Leverkusen; Wolfgang Behrenz, Overath; Ingeborg Hammann, Cologne, and Wilhelm Stendel, Wuppertal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

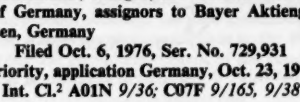
Filed Oct. 6, 1976, Ser. No. 729,931

Claims priority, application Germany, Oct. 23, 1975, 2547513

Int. Cl.[2] A01N *9/36;* **C07F** *9/165, 9/38*

U.S. Cl. 424—212 **10 Claims**

1. An O-alkyl-O-(1-carbalkoxy-2-tert.-pentyrylvinyl)-(thiono)(thiol)phosphoric(phosphonic) acid ester or ester-amide of the formula



in which

R and R_2 each independently is alkyl with 1 to 6 carbon atoms,

R_1 is phenyl, or alkyl, alkoxy, alkylthio or alkylamino each with 1 to 6 carbon atoms, and

X is oxygen or sulfur.

2. A method of combating insect or acarid pests which comprises applying to the pests or a habitat thereof an insecticidally or acaricidally effective amount of a compound according to claim 1.

4,078,058

CERIUM SULFADIAZINE FOR TREATING BURNS

Charles L. Fox, Jr., Sherman, Conn., assignor to Research Corporation, New York, N.Y.

Filed Jul. 13, 1976, Ser. No. 704,817

Int. Cl.[2] A61K *31/63;* **C07D** *239/44*

U.S. Cl. 424—228 **19 Claims**

1. A composition useful in treating burns consisting essentially of an effective antibacterial amount of cerous sulfadiazine and a water-dispersible, hydrophilic carrier therefor, wherein said cerous sulfadiazine is dispersed in said carrier.

4,078,059

NOVEL 2,2-DIMETHYL STEROIDS

Lucien Nedelec, Le Raincy; Vesperto Torelli, Maisons-Alfort, and Robert Fournex, Paris, all of France, assignors to Roussel UCLAF, Paris, France

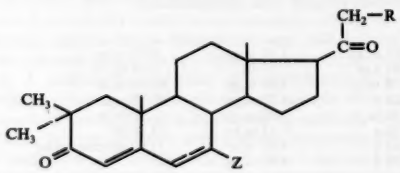
Filed Aug. 31, 1976, Ser. No. 719,138

Claims priority, application France, Sep. 2, 1975, 75 26859

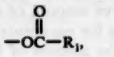
Int. Cl.[2] C07J *5/00;* **A61K** *31/56*

U.S. Cl. 424—242 **16 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of hydrogen, —OH and



R_1 is selected from the group consisting of hydrogen and hydrocarbon of 1 to 17 carbon atoms, Z is selected from the group consisting of hydrogen and

in the α-position, R_2 is alkyl of 1 to 4 carbon atoms and the dotted line in the B ring indicates the optional presence of a double bond in the 6(7) position.

15. A method of treating hypertension and cardiac insufficiency in warm-blooded animals comprising administering to warm-blooded animals an effective amount of at least one compound of claim 1.

4,078,060

METHOD OF INDUCING AN ESTROGENIC RESPONSE

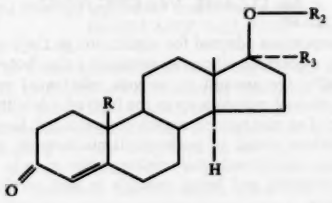
Harvey D. Benson, Cincinnati; Joyce Francis Grunwell, Hamilton; John O'Neal Johnston, Cincinnati, all of Ohio, and Vladimir Petrow, Chapel Hill, N.C., assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed May 10, 1976, Ser. No. 684,944

Int. Cl.[2] A61K *31/56*

U.S. Cl. 424—242 **7 Claims**

1. A method of inducing an estrogenic response in a patient in need thereof which comprises administering to said patient a compound of the formula in an amount effective to induce an estrogenic response:



wherein R is —CHO or —CH_2OR_1; each of R_1 and R_2 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms; R_3 is hydrogen; or R_2 and R_3 together form a double bond between the 17- position carbon atom and the oxygen atom; and a pharmaceutically acceptable carrier.

4,078,061

METHOD OF TREATING ACNE

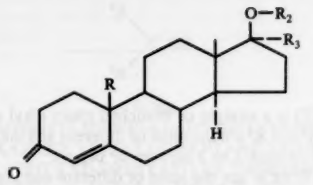
Harvey D. Benson, Cincinnati; Joyce Francis Grunwell, Hamilton; John O'Neal Johnston, Cincinnati, all of Ohio, and Vladimir Petrow, Chapel Hill, N.C., assignors to Richardson-Merrell Inc., Wilton, Conn.

Filed May 10, 1976, Ser. No. 684,948

Int. Cl.[2] A61K *31/56*

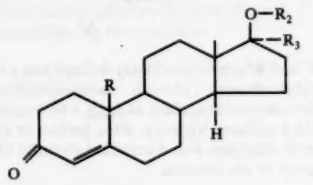
U.S. Cl. 424—242 **40 Claims**

1. A method of treating acne and oily skin in a patient in need thereof which comprises administering to said patient an effective amount of a compound of the formula:



wherein R is —CHO or —CH_2OR_1; each of R_1 and R_2 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms; carbon atoms; R_3 is hydrogen; or R_2 and R_3 together form a double bond between the 17- position carbon atom and the oxygen atom.

37. An anti-acne and anti-seborrheic pharmaceutical composition in the form of an ointment for topical administration comprising an anti-acne effective amount of a compound of the formula:



wherein R is —CHO or —CH_2OR_1; each of R_1 and R_2 is hydrogen, alkylcarbonyl wherein the alkyl moiety has from 1 to 20 carbon atoms and is straight or branched, benzoyl, phenylalkylcarbonyl wherein the alkyl moiety has from 1 to 6 carbon atoms and is straight or branched or cycloalkylcarbonyl wherein the cycloalkyl moiety has from 5 to 10 carbon atoms; R_3 is hydrogen; or R_2 and R_3 together form a double bond between the 17- position carbon atom and the oxygen atom and a pharmaceutically acceptable carrier.

4,078,062

SUBSTITUTED 2H-1,4-BENZOTHIAZIN-3(4H)-ONES

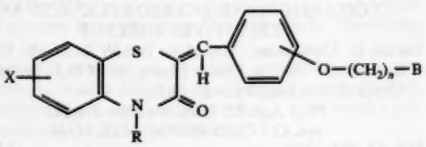
John Krapcho, Somerset, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 28, 1976, Ser. No. 736,620

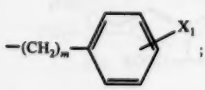
Int. Cl.[2] C07D *279/16, 417/06, 279/28;* **A61K** *31/54*

U.S. Cl. 424—246 **13 Claims**

1. A compound of the formula



wherein R is hydrogen, lower alkyl, or



X and X_1 are independently selected from the group consisting of hydrogen, halogen, lower alkyl, lower alkoxy, trifluoromethyl, nitro and amino; *m* is 1, 2 or 3; *n* is 2, 3, 4, or 5; and B is di(lower alkyl)amino wherein each lower alkyl is the same or different, piperidinyl, pyrrolidinyl, morpholino, or N-lower alkyl-piperazino; and a pharmaceutically acceptable salt thereof.

12. A pharmaceutical composition useful for treating inflammation in a mammalian specie comprising from about 1 mg./kg. to about 70 mg./kg. of a compound or mixture of compounds of claim 1 and a pharmaceutically acceptable carrier.

4,078,063

PIPERAZINYLPYRIDINES

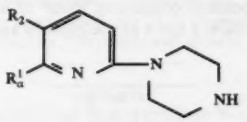
William C. Lumma, Jr., Pennsburg, and Walfred S. Saari, Lansdale, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Sep. 24, 1976, Ser. No. 726,713

Int. Cl.[2] C07D *401/04;* **A61K** *31/495*

U.S. Cl. 424—250 **5 Claims**

2. A method of decreasing food intake which comprises administering to a patient in need of such treatment an effective amount of a compound of formula



or pharmaceutically acceptable salt thereof, wherein

R_a^1 is hydrogen, halo, trifluoromethyl, lower alkoxy, phenylthio, lower alkylthio, di(lower alkyl)amino, or lower alkyl; and

R^2 is hydrogen, halo or phenyl.

4,078,064

8H-PYRAZOLO[4',3':5,6]PYRIDO[3,4-E][1,2,4]TRIAZOLO[1,5-A]PYRIMIDINES

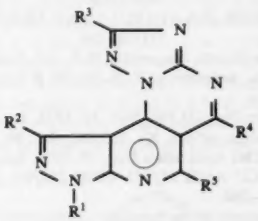
Theodor Denzel, Regensburg, and Hans Hoehn, Tegernheim, both of Germany, assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 18, 1976, Ser. No. 715,599

Int. Cl.[2] A61K *31/415, 31/505;* **C07D** *471/22*

U.S. Cl. 424—251 **15 Claims**

1. A compound of the formula



wherein

R^1 is hydrogen, lower alkyl, phenyl, phenyl-lower alkylene, benzoyl or substituted benzoyl wherein the benzoyl substituent is one or two halogens, lower alkyl or trifluoromethyl groups;

R^2 is hydrogen, lower alkyl or phenyl;

R^3 is hydrogen, lower alkyl, phenyl, lower alkylthio or lower alkylsulfinyl;

R^4 is

or lower alkoxy

R^5 is hydrogen or lower alkyl;

R^6 is hydrogen, lower alkyl, substituted lower alkyl wherein the lower alkyl substituent is

phenyl, substituted phenyl wherein the phenyl substituent is halogen, lower alkyl or trifluoromethyl;

R^7 is hydrogen or lower alkyl;

R^9 and R^{10} each is hydrogen or lower alkyl; and phsiologically acceptable acid addition salts thereof.

14. A composition comprising about 10 to 300 mg. of a compound of claim **1** and a physiologically acceptable carrier therefor.

4,078,065

ORGANIC COMPOUNDS

Joachim Franz, Riehen, Switzerland, assignor to Sandoz Ltd., Basel, Switzerland

Continuation-in-part of Ser. No. 591,059, June 27, 1975, abandoned. This application Jul. 2, 1976, Ser. No. 702,157

Claims priority, application Switzerland, Jul. 4, 1974, 9204/74; Dec. 22, 1975, 16588/75

Int. Cl.[2] A61K *31/48, 31/135*

U.S. Cl. 424—261 **19 Claims**

1. A pharmaceutical composition comprising aggregates of diameter of at most 20,000 A, comprising component a) a therapeutically effective amount of ergot alkaloid, and component b) a pharmaceutically acceptable ethoxylated cholesterin emulsifier having an HLB value of from 10 to 30 and present in an amount greater than 10 times by weight of the ergot alkaloid.

4,078,066

CYCLOHEXANE TETROLS AND DERIVATIVES THEREOF

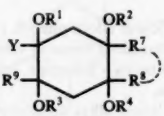
Frederic Peter Hauck, Somerville, N.J., and Joseph E. Sundeen, Yardley, Pa., assignors to E. R. Squibb & Sons, Inc., Princeton, N.J.

Division of Ser. No. 633,046, Nov. 18, 1975, Pat. No. 4,033,971, which is a division of Ser. No. 383,642, Jul. 30, 1973, Pat. No. 3,936,465. This application Dec. 17, 1976, Ser. No. 751,938

Int. Cl.[2] A61K *31/455;* **C07D** *213/02, 213/90*

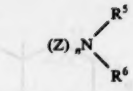
U.S. Cl. 424—266 **7 Claims**

1. A compound of the formula



wherein

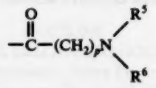
Y is a radical of the formula



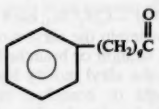
wherein (Z) is a straight or branched chain alkyl radical, n is 1–6, and R^5 and R^6 are the same or different and may be hydrogen, alkyl of from 1 to 3 carbons or benzyl;

R^1, R^2, R^3 or R^4 are the same or different and are hydrogen; alkyl of from 1 to 4 carbons, trifluoromethyl; alkanoyl of from 1 to 4 carbons; haloalkanoyl of from 1 to 4 carbons; alkoxycarbonyl of the formula

wherein R is an alkyl radical of from 1 to 4 carbons; alkoxyalkyl wherein the alkoxy group has 1 to 3 carbons and the alkyl group has 1 to 3 carbons; aminoalkanoyl of the formula



wherein R^5 and R^6 are as previously defined and p is 0–3, 2-, 3-, or 4-pyridylcarbonyl; phenyl; mono-substituted phenyl wherein the substituent is alkyl of from 1 to 4 carbons, alkoxy of from 1 to 4 carbons, hydroxy, nitro, amino, or dialkylamino wherein each alkyl has 1 to 4 carbons; alkenoyl of 3 to 4 carbons; or aroyl of the formula



wherein q is 0 to 3;

R^9 is H, or a straight or branched chain alkyl radical of 1-6 carbon atoms;

R^7 and R^8 are the same or different and may be hydrogen or alkyl of from 1 to 4 carbons, or R^7 and R^8 taken together with the carbon atoms bearing substituents OR^2 and OR^4 form a cycloalkyl ring having 5 to 7 carbons.

2. A method of treating hypertension in mammalian species comprising administering an effective amount of a compound defined in claim **1**.

4,078,067

3-(β-AMINOETHYLIDENE)-7-OXO-4-OXAAZABICYCLO[3.2.0]HEPTANE-2-CARBOXYLIC ACID AND DERIVATIVES THEREOF

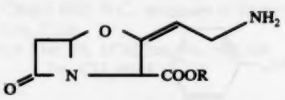
Burton G. Christensen, Metuchen; Robert B. Morin, Warren, and Edward Walton, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Apr. 12, 1976, Ser. No. 676,262

Int. Cl.[2] C07D *498/04;* **A61K** *31/42*

U.S. Cl. 424—272 **5 Claims**

1. A compound having the structure:



and the pharmaceutically acceptable salts thereof

4. An antibiotic pharmaceutical composition comprising in unitary dosage form, a therapeutically effective amount of a

compound according to claim 1 and a pharmaceutical carrier therefor.

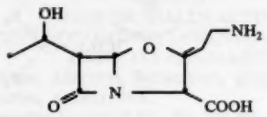
4,078,068

3-(β-AMINOETHYLIDENE)-6-(α-HYDROXYETHYL)-7-OXO-4-OXAAZABICYCLO[3.2.0]HEPTANE-2-CARBOXYLIC ACID AND DERIVATIVES THEREOF

Burton G. Christensen, Metuchen; Robert B. Morin, Warren, and Edward Walton, Scotch Plains, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

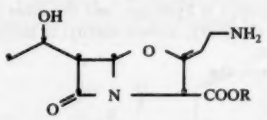
Filed Apr. 12, 1976, Ser. No. 676,253
Int. Cl.[2] C07D *498/04;* A61K *31/42*
U.S. Cl. 424—272 5 Claims

1. A compound having the structure:



and the pharmaceutically acceptable salts thereof.

2. A compound having the structure:



wherein R is selected from the group consisting of alkyl having 1 to 6 carbon atoms; pivaloyloxymethyl, halo- and perhaloalkyl having 1 to 6 carbon atoms wherein the halogen is chloro, fluoro or bromo; alkenyl having from 2 to 6 carbon atoms; benzyl, benzhydryl, p-t-butylbenzyl, p-bromobenzyl, phthalidyl, 5-indanylmethyl, phenyl, 5-indanyl, acetylthiomethyl, acetylthioethyl, pivaloythiomethyl, and alkylthioalkyl, having 2 to 6 carbon atoms.

4,078,069

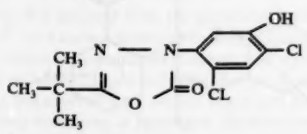
AGRICULTURAL FUNGICIDAL COMPOSITION

Laurent Lacroix, Saint Fargeau, France, assignor to Philagro, Lyon, France

Filed Aug. 3, 1976, Ser. No. 711,367
Claims priority, application France, Aug. 13, 1975, 75 25210
Int. Cl.[2] A01N *9/22*
U.S. Cl. 424—272 4 Claims

1. A process for controlling fungi on plants, comprising applying to said plants

a fungicidal composition consisting essentially of, as the active material, a fungicidally-effective amount of 3-(2,4-dichloro-5-hydroxy-phenyl)-5-tertiary butyl-1,3,4-oxadiazolin-2-one of the formula:



in association with at least one agriculatural carrier and a surface-active agent for agricultural use and compatible with the said compound.

4,078,070

FUNGICIDAL DISPERSIONS

Konrad Albrecht; Heinz Frensch, both of Frankfurt am Main; Kurt Hartel, and Helmut Stingl, both of Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 432,825, Jan. 14, 1974, abandoned. This application Sep. 9, 1975, Ser. No. 611,788
Claims priority, application Germany, Jan. 16, 1973, 2301921
Int. Cl.[2] A01N *9/22, 9/28*
U.S. Cl. 424—273 R 8 Claims

1. A fungicidal dispersion comprising 5 to 50% by weight of 2-methyl-5,6-dihydropyran-3-carboxylic acid anilide in combination with either benzimidazole-2-carbamic acid methyl ester in a proportion from 1.5:1 to 1:1.5 or 1-n-butyl-carbamoyl-benzimidazole-2-carbamic acid methyl ester in proportions from 1.5:1 to 1:1.5 and a C_8 to C_{25} paraffin boiling at a temperature above 140° C, liquid triglycerides or liquid esters of C_1 to C_{12} monoalcohols with C_2 to C_{10} carboxylic acids, the esters containing at least 8 carbon atoms and at most 12 carbon atoms in the event the ester is of a monobasic acid, and at most 32 carbon atoms in the event the ester is of a dibasic acid or mixtures of said liquid triglycerides with said liquid esters further comprising 0.2 to 5% by weight, based on the total weight percent of the dispersion, of an aluminum chelate of a polynuclear hydroxy-quinone as a stabilizer, said chelate being selected from the group consisting of an aluminum chelate of naphthazarin, quinizarin, chrysazim and alizarin.

4,078,071

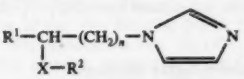
DERIVATIVES OF SUBSTITUTED N-ALKYL IMIDAZOLES

Keith A. M. Walker, Palo Alto, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 665,023, March 8, 1976, abandoned, which is a continuation-in-part of Ser. No. 599,618, Jul. 28, 1975, abandoned. This application Jan. 10, 1977, Ser No. 758,094
Int. Cl.[2] A61K *31/415;* C07D *233/60*
U.S. Cl. 424—273 R 35 Claims

1. A compound of the formula

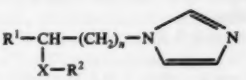
(I)



wherein R^1 is phenethyl, phenylpropyl or styryl and R^2 is phenyl, phenyl straight chain lower alkyl or phenyl straight chain alkenyl, wherein the phenyl rings of R^1 and R^2 may independently be unsubstituted or substituted with one or more substituents independently selected from the group consisting of lower alkyl of from one to four carbon atoms, halo and trifluoromethyl; X is oxygen or sulfur; *n* is an integer of from one to three; and the antimicrobial acid addition salts therof.

32. A method of inhibiting the growth of fungi, bacteria or protozoa which comprises applying to a host object containing, or subject to attack by, fungi, bacteria or protozoa an effective amount of a compound of the formula

(I)



wherein R^1 is phenyl, phenylpropyl or styryl and R^2 is phenyl, phenyl straight chain lower alkyl or phenyl straight chain lower alkenyl wherein the phenyl rings of R^1 and R^2 may independently be unsubstituted or substituted with one or more substituents independently selected from the group consisting of lower alkyl of from one to four carbon atoms, halo and trifluoromethyl; X is oxygen or sulfur; *n* is a integer of from 1

to 3; or an antimicrobial acid addition salt thereof, or a composition containing same as an active ingredient.

4,078,072

N-TRICYCLIC DERIVATIVES OF AZETIDINE AND PHARMACEUTICAL COMPOSITIONS AND METHODS CONTAINING THEM

Piero Melloni, Milan; Arturo Della Torre, Varese; Francesco Lauria, Milan; Norina Passerini, Milan; Alessandro Rossi, Milan, and Raffaele Tommasini, Milan, all of Italy, assignors to Carlo Erba S.p.A., Milan, Italy

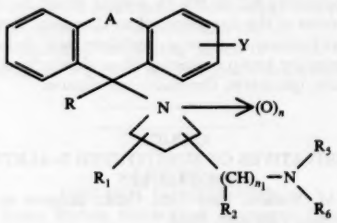
Division of Ser. No. 647,980, Jan. 9, 1976. This application Nov. 2, 1976, Ser. No. 738,375

Claims priority, application Italy, Jan. 24, 1975, 19535/75

Int. Cl.[2] C07D *409/04;* A61K *31/39*

U.S. Cl. 424—275 **17 Claims**

1. A compound of the formula:



wherein

A is $-CH_2-S-$ or $-S-CH_2-$;

R, R_1 and R_2 each independently represent a hydrogen atom or a C_1–C_6 alkyl;

Y is a hydrogen atom; a C_1–C_6 alkyl; a halogen atom; a trifluoromethyl; an $-OR_3$, wherein R_3 is hydrogen or C_1–C_6 alkyl; or a $-SO_2R_4$, wherein R_4 is C_1–C_6 alkyl, an amino or an amino substituted by 1–2 C_1–C_6 alkyls;

n is 0 or 1;

n_1 is 0, 1 or 2;

R_5 and R_6 each independently represent;

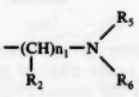
a. hydrogen;

b. formyl;

c. a C_1 – C_6 alkyl, a C_2 – C_6 alkenyl or a C_2 – C_6 alkynyl group, wherein each of the alkyl, alkenyl and alkynyl groups can be substituted by a substituent selected from the group consisting of halogen, C_1 – C_6 alkoxy, C_3 – C_7 cycloalkyl, amino, amino substituted by 1–2 C_1 – C_6 alkyl groups, phenyl, and phenyl substituted by at least one Y radical, wherein Y is as defined above;

d. a C_2 – C_6 alkanoyl group, wherein the alkyl chain can be substituted by a substituent selected from the group consisting of halogen, C_1 – C_6 alkoxy, amino, an amino substituted by 1–2 C_1 – C_6 alkyl groups, phenyl, and phenyl substituted by at least one Y radical, wherein Y is as defined above,

provided that when n_1 is 0, the



radical is exclusively bound to the carbon atom in the 3-position of the azetidine radical;

or a pharmaceutically acceptable salt thereof.

4,078,073

N-TRICYCLIC DERIVATIVES OF AZETIDINE

Piero Melloni, Milan; Arturo Della Torre, Varese; Francesco Lauria, Milan; Norina Passerini, Milan; Alessandro Rossi, Milan, and Raffaele Tommasini, Milan, all of Italy, assignors to Carlo Erba S.p.A., Milan, Italy

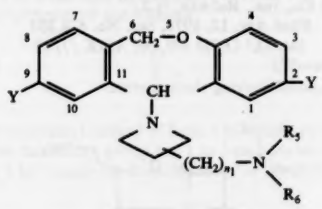
Division of Ser. No. 647,980, Jan. 9, 1976. This application Nov. 2, 1976, Ser. No. 738,373

Claims priority, application Italy, Jan. 24, 1975, 19535/75

Int. Cl.[2] C07D *313/12*

U.S. Cl. 424—278 **16 Claims**

1. A compound of formula:



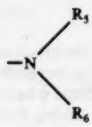
wherein:

n_1 is zero or 1

R_5 and R_6 each independently represent hydrogen or C_1–C_6 alkyl; and

one of the *Y* groups is hydrogen and the other is hydrogen, halogen, C_1–C_6 alkoxy, trifluoromethyl or methylsulphonyl, provided that,

when n_1 is zero, the



radical is exclusively bound to the carbon atom in the 3-position of the azetidine radical,

and the salts thereof with pharmaceutically acceptable acids.

4,078,074

2H-CHROMENE-2-SPIRO-3'-PHTHALIDES USEFUL AS HORTICULTURAL AND AGRICULTURAL FUNGICIDES

Tomomasa Misato, Tokyo; Keido Ko, Wako; Yasuo Homma, Kawagoe; Kazuhiko Konno, Ami; Yosio Hayasi, Ami; Tetsuo Sekiya, Ami, and Kozo Sato, Hatogaya, all of Japan, assignors to Rikagaku Kenkyusho and Mitsubishi Petrochemical Company Limited, Japan

Filed Nov. 25, 1975, Ser. No. 635,385

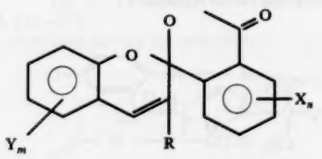
Claims priority, application Japan, Dec. 3, 1974, 49-138999

Int. Cl.[2] A01N *9/28;* C07D *307/83, 307/87*

U.S. Cl. 424—279 **23 Claims**

1. An agricultural and horticultural fungicidal composition in the form of a wettable powder, an emulsifiable liquid or a dust containing at least one compound of the formula

(II)

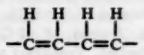


wherein

R stands for hydrogen, lower alkyl or aryl;

X stands for hydrogen, lower alkyl or halogen;

Y stands for a hydrogen, halogen, lower alkyl, alkyl substituted amino, nitro, alkoxy group, or



which together with the phenyl ring in said 2H-chromeme ring forms a benzo [f]—2H-chromene ring, *m* and *n* stand for an integer of 1 to 4, in the amount of 0.1–90% and inert components selected from the group of (a) an organic solvent and a surface active agent (b) a solid carrier and (c) a surface active agent and a solid carrier.

4,078,075
INSECTICIDALLY ACTIVE 3-N-(4-TRIFLUOROMETHYLPHENYL)-CARBAMOYL-4-HYDROXY-COUMARIN

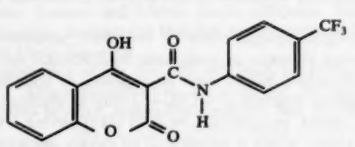
Ernst Beriger, Allschwil, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 724,829, Sep. 20, 1976, abandoned. This application Mar. 24, 1977, Ser. No. 780,896

Int. Cl.² C07D *311/22*

U.S. Cl. 424—281 **8 Claims**

1. The compound 3-N-(4-trifluoromethylphenyl)-carbamoyl-4-hydroxy-coumarin of the formula I



(I)

4,078,076
NOVEL P-(4-TETRAHYDROPYRANYL)-PHENOXY-COMPOUNDS

Francois Clemence, Rosny-sous-Bois; Daniel Humbert, and Robert Fournex, both of Paris, all of France, assignors to Roussel UCLAF, Paris, France

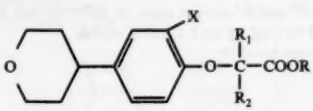
Filed May 26, 1976, Ser. No. 690,010

Claims priority, application France, Jun. 3, 1975, 75 17271

Int. Cl.² **A61K** *31/35;* **C07D** *309/22*

U.S. Cl. 424—283 **16 Claims**

1. A compound of the formula



wherein R is selected from the group consisting of hydrogen, alkyl of 1 to 6 carbon aoms and cations of alkali metals, alkaline earth metals, aluminum, alkylamines and ammonium, R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1to 4 carbon atoms and X is selected from the group consisting of hydrogen, chlorine and bromine.

13. A method of lowering serum lipid levels in warm-blooded animals in need thereof comprising administering to said animals an hypolipemically effective amount of at least one compound of claim 1.

4,078,077
CYCLODIENE INSECTICIDES

Gerald Thomas Brooks, Burgess Hill, England, assignor to National Research Development Corporation, London, England

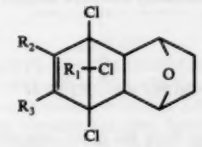
Filed Nov. 5, 1976, Ser. No. 739,324

Claims priority, application United Kingdom, Nov. 6, 1975, 46076/75

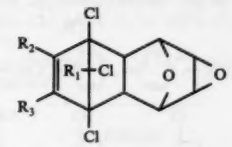
Int. Cl.² **A01N** *9/28;* **C07D** *307/87*

U.S. Cl. 424—285 **12 Claims**

1. A compound of the class represented by the formulas:



and



wherein each of R_1, R_2 and R_3 is hydrogen or chloro, at least one being hydrogen and wherein R_1 is syn with respect to the double bond.

10. An insecticidal composition comprising an insecticidally effective amount of a compound according to claim 1 and a carrier.

4,078,078
NOVEL XANTHONE-2-CARBOXYLIC ACID COMPOUNDS

Alan Charles Barnes; Peter Wilfred Hairsine; Peter John Ramm, all of Swindon, and John Bodenham Taylor, Down Ampney, near Cirencester, all of England, assignors to Roussel UCLAF, Paris, France

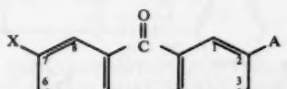
Division of Ser. No. 592,176, Jul. 1, 1975, Pat. No. 4,024,276. This application Feb. 22, 1977, Ser. No. 770,302

Claims priority, application United Kingdom, Jul. 9, 1974, 30428/74; May 16, 1975, 20876/75

Int. Cl.² **C07D** *311/86*

U.S. Cl. 424—283 **6 Claims**

1. A compound of the formula



wherein A is —COOR′, R′ is selected from the group consisting of hydrogen, alkyl of 1 to 5 carbon atoms and cation of a non-toxic, pharmaceutically acceptable organic or inorganic base, R is selected from the group consisting of hydrogen, alkyl of 1 to 9 carbon atoms, alkoxy of 1 to 9 carbon atoms and alkoxy alkoxy of 2 to 9 carbon atoms and X is

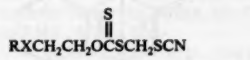
wherein R_1 is alkyl of 1 to 5 carbon atoms, R_2 is a carbamoyl.

4,078,079
THIOCYANO-XANTHATE MITICIDES

Llewellyn W. Fancher, Orinda, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

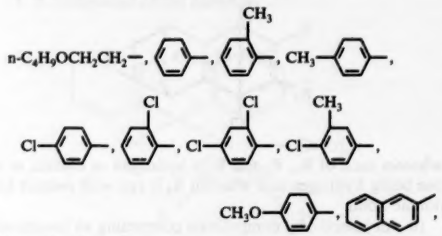
Division of Ser. No. 561,951, Mar. 31, 1975, Pat. No. 3,965,137, which is a continuation-in-part of Ser. No. 466,106, May 2, 1974, abandoned. This application Mar. 15, 1976, Ser. No. 666,719
Int. Cl.[2] A01N *9/12;* A61K *31/265*
U.S. Cl. 424—301 19 Claims

1. The method of controlling mites comprising applying the habitat thereof a miticidally effective amount of a compound having the formula



wherein R is selected from the group comprising

CH_3—, C_2H_5—, n-C_4H_9—, $C_2H_5OCH_2CH_2$—,



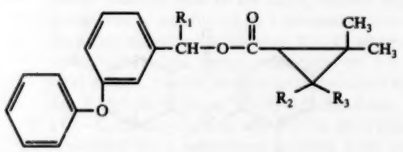
and X equals -O or S.

4,078,080
ORAL ADMINISTRATION OF PYRETHROIDS TO WARM-BLOODED ANIMALS TO PREVENT FLY DEVELOPMENT IN THEIR DROPPINGS

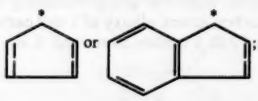
Michael Stanley Schrider, South Bound Brook, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Dec. 13, 1976, Ser. No. 750,088
Int. Cl.[2] A01N *9/20*
U.S. Cl. 424—304 6 Claims

1. A method for the control of development of flies in the manure of warm-blooded animals, comprising administering to the animals orally, a compound of formula:



wherein R_1 is hydrogen or cyano; R_2 and R_3 together with the carbon atom to which they are attached represent a cyclic moiety of



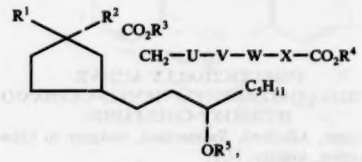
wherein the carbon atom of the cyclic moiety marked with an asterisk is shared with the cyclopropane ring, and wherein ═══ represents a single or double bond; in amounts corresponding to 0.1 mg. to 5.0 mg/kg body weight of the annimals.

4,078,081
CYCLOPENTANE DERIVATIVES MANUFACTURE

Ulrich Lerch, Hofheim, Taunus; Milos Babej, Frankfurt am Main; Wilhelm Bartmann, Neuenhain, Taunus, and Rudolf Kunstmann, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Jun. 2, 1975, Ser. No. 582,927
Claims priority, application Germany, Jun. 4, 1974, 2426853
Int. Cl.[2] C07C *177/00;* A61K *31/19, 31/215*
U.S. Cl. 424—305 9 Claims

1. A compound of the formula



wherein

R^1 and R^2 together are oxygen, or one is hydrogen and the other is hydroxy;

R^3 is alkyl having up to 5 carbon atoms;

R^4 is hydrogen, alkyl having 1 to 10 carbon atoms, or is a physiologically tolerable monovalent or polyvalent cation;

R^5 is hydrogen, straight-chain or branched, saturated or unsaturated aliphatic or araliphatic hydrocarbon having up to 20 carbon atoms, such an aliphatic or araliphatic hydrocarbon wherein a $—CH_2—$ group is replaced by oxygen, sulfur, or carbonyl, or R^5 is alkyl having 1 to 5 carbon atoms which is substituted by cyano, alkoxy-carbonyl having 2 to 4 carbon atoms, or R^5 is cycloalkyl having 5 to 8 carbon atoms wherein the $—CH_2—$ group in the 2-position is replaced by oxygen or sulfur, or R^5 is an aliphatic, cycloaliphatic, aromatic, or araliphatic carboxylic acid having up to 20 carbon atoms, or is alkoxy-carbonyl having 2 to 4 carbon atoms;

U is $—(CH_2)_m$, where m is 0 or an integer from 1 to 5;

V is a direct bond, oxygen, or

wherein P1 R^6 and R^7 are the same or different and are hydrogen or alkyl having up to 5 carbon atoms;

W is a direct bond or

wherein

R^8 and R^9 are the same or different and are hydrogen or alkyl having up to 5 carbon atoms; and X is $—(CH_2)_n$, where n is 0 or an integer from 1 to 5.

4,078,082

MUCOLYTICALLY EFFECTIVE AGENTS

Lucien Lakah; Gabriel Maillard, both of Paris; Maurice Joullie, Yvelines, and Christian Jean Marie Warolin, Paris, all of France, assignors to S.A. Joullie International, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 631,126, Nov. 11, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,555
Claims priority, application France, Nov. 13, 1974, 74 37397
The portion of the term of this patent subsequent to Mar. 7, 1995, has been disclaimed.
Int. Cl.[2] A61K *31/19*
U.S. Cl. 424—317 11 Claims

1. A mucolytic composition comprising a mucolytically effective amount of (carboxyalkythio)acetic acid of the formula

HOOC—alk—S—CH_2COOH

wherein alk is alkylene of 3 to 5 carbon atoms in the form of the acid or pharmaceutically acceptable salt thereof and a pharmaceutically compatible carrier therefor said composition being in the form of a suppository, tablet or syrup.

4,078,083

NOVEL PROSTANOIC ACIDS

Milos Babej, Frankfurt am Main; Wilhelm Bartmann, Neuenhain, Taunus, and Ulrich Lerch, Hofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Continuation of Ser. No. 505,685, Sept. 13, 1974, abandoned. This application Feb. 19, 1976, Ser. No. 659,239
Claims priority, application Germany, Sep. 17, 1973, 2346706
Int. Cl.[2] C07C *177/00;* A61K *31/19*
U.S. Cl. 424—317 2 Claims

1. 15-α-hydroxy-5-methyl-9-oxo-13-trans-prostenoic acid and physiologically acceptable salts thereof with an organic or inorganic base.

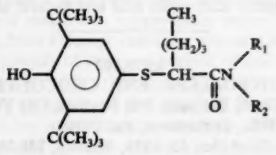
4,078,084

NOVEL HYPOLIPIDEMIC 2-(3,5-DI-TERT-BUTYL-4-HYDROXYPHENYL)THIO CARBOXAMIDES

Eugene R. Wagner, Midland, and Larry G. Mueller, Ypsilanti, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

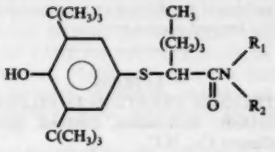
Division of Ser. No. 658,971, Feb. 18, 1976, Pat. No. 4,029,812. This application Mar. 4, 1977, Ser. No. 774,552
Int. Cl.[2] A61K *31/15, 31/165*
U.S. Cl. 424—324 7 Claims

1. A compound of the formula:



wherein R_1 represents hydroxy and R_2 represents hydrogen, lower alkyl, hydroxy, or lower hydroxyalkyl.

3. A method for lowering elevated serum lipids in a mammal which comprises administering internaliy to the mammal a hypolipidemically effective amount of a compound of the formula:



wherein R_1 represents hydroxy and R_2 represents hydrogen, lower alkyl, hydroxy, or lower hydroxyalkyl.

4,078,085

3-AMINOMETHYL-4-HOMOISOTWISTANE AND ITS SALT AND PROCESS FOR PRODUCING SAME

Yoshiaka Inamoto; Yoshiaka Fujikura; Hiroshi Ikeda, all of Wakayama, and Naotake Takaishi, Iwade, all of Japan, assignors to Kao Soap Co., Ltd., Tokyo, Japan

Filed Jun. 28, 1976, Ser. No. 700,155
Claims priority, application Japan, Aug. 6, 1975, 50-95562
Int. Cl.[2] A61K *31/13;* C07C *87/32*
U.S. Cl. 424—325 3 Claims

1. 3-Aminomethyltricyclo [5.3.1.$0^{3,8}$] undecane and acid addition salts thereof.

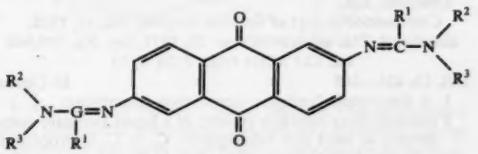
4,078,086

ANTHRAQUINONE-BIS-AMIDINES AND PROCESS FOR PREPARING THEM

Erhardt Winkelmann, Kelkeim, Taunus, and Wolfgang Raether, Dreieichenhain, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 12, 1976, Ser. No. 685,792
Claims priority, application Germany, May 14, 1975, 2521357
Int. Cl.[2] A61K *31/155;* C07C *123/00*
U.S. Cl. 424—326 7 Claims

1. An anthraquinone-bis-amidine of the formula:



in which R^1, R^2 and R^3 may be identical or different from each other and each represents hydrogen or alkyl of 1 to 4 carbon atoms, as well as an addition salt thereof with a physiologically acceptable acid.

4,078,087

METHOD AND COMPOSITION FOR TREATING TREES USING CERTAIN QUATERNARY AMMONIUM COMPOUNDS

Sam M. Hyman, 2216 LaFollette Ave., Manitowoc, Wis. 54220

Filed Mar. 19, 1976, Ser. No. 668,362
Int. Cl.[2] A01N *9/20, 9/24*
U.S. Cl. 424—329 4 Claims

1. The method of treating trees to inhibit growth of destructive fungi comprising the step of injecting the water transmitting zone of the tree with a fungicidal solution consisting of a blend of water soluble quaternary ammonium chlorides and wherein the blend is a concentrate of dimethyl benzyl ammonium chlorides n-alkyl (60% C14, 30% C16, 5% C12, 5% C18) and dimethyl ethylbenzyl ammonium chlorides n-alkyl (50% C12, 30% C14, 17% C16, 3% C18) and the concentrate includes 20% by weight of ethyl alcohol, 27% dimethyl benzyl ammonium chlorides and 32% dimethyl ethylbenzyl ammonium chlorides and the concentrate is diluted with water in a ratio range by weight of between one part concentrate to 30

parts water and one part concentrate to 110 parts water and one to three gallons of the diluted concentrate are inoculated in each tree being treated once a year.

4,078,088

METHOD OF TREATING THEILERIOSIS

Nicholas McHardy, Beckenham, England, assignor to Burroughs Wellcome Co., N.C.

Filed Feb. 10, 1977, Ser. No. 767,453

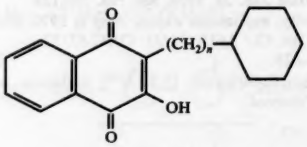
Claims priority, application United Kingdom, Feb. 10, 1976, 5100/76

Int. Cl.[2] A61K *31/12*

U.S. Cl. 424—331 **15 Claims**

1. A method of treating theileriosis in cattle and sheep both therapeutically and prophylactically, comprising the administration of an effective amount of a compound which is a 2-hydroxy-1,4-naphthoquinone derivative of formula (I) or a pharmaceutically acceptable salt thereof,

(I)



wherein *n* is zero or 1 to 12, to an animal which is susceptible and infected with or potentially exposed to an infection with *Theileria* species.

4,078,089

THIXOTROPIC FUMIGANT COMPOSITIONS CONTAINING LIQUID HALOALIPHATIC HYDROCARBON

Robert P. Levek, and Perry C. Heath, both of West Lafayette, Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.

Continuation-in-part of Ser. No. 596,366, Jul. 16, 1975, abandoned. This application Apr. 19, 1977, Ser. No. 788,944

Int. Cl.[2] A01N *9/02, 9/20, 9/30*

U.S. Cl. 424—349 **10 Claims**

1. A thixotropic fumigant composition comprising:

a nematocidally effective amount of a liquid fumigant comprising at least one haloaliphatic C_1 to C_3 hydrocarbon wherein the halogen is selected from the group consisting of chlorine, bromine, and mixtures thereof;

about 1.1–1.5 percent by weight of a silica gelling agent having a BET surface area of about 175–225 square meters per gram; and

about 0.25–1.25 percent by weight of an epoxide stabilizer selected from the group consisting of epichlorohydrin, epibromohydrin, butylene oxide and mixtures thereof, the amount of the gelling agent being greater than the amount of the epoxide stabilizer.

4,078,090

(CARBOXYMETHYLTHIO)ACETIC ACID AND SALTS THEREOF USED AS MUCOLYTIC AGENTS

Lucien Lakah; Gabriel Maillard, both of Paris; Maurice Joullie, Saint-Germain-en-Laye, and Christian Jean Marie Warolin, Paris, all of France, assignors to S.A. Joullie International, Neuilly-sur-Seine, France

Continuation-in-part of Ser. No. 631,126, Nov. 11, 1975, abandoned. This application Oct. 12, 1976, Ser. No. 731,556

Claims priority, application France, Nov. 13, 1974, 74 37397

The portion of the term of this patent subsequent to Mar. 8, 1995, has been disclaimed.

Int. Cl.[2] A61K *31/19*

U.S. Cl. 424—317 **2 Claims**

1. A method of providing a mucolytic effect to a patient having a disorder requiring a mucolytic effect which comprises administering to said patient a mucolytically effective amount of (carboxymethylthio) acetic acid or pharmaceutically acceptable salt thereof.

4,078,091

POLYMERIC N-SUBSTITUTED MALEIMIDE ANTIOXIDANTS

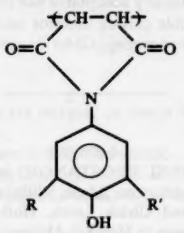
James A. Dale, Menlo Park, and Steve Y. W. Ng, San Francisco, both of Calif., assignors to Dynapol, Palo Alto, Calif.

Division of Ser. No. 565,168, Apr. 4, 1975, abandoned. This application Dec. 18, 1975, Ser. No. 642,038

Int. Cl.[2] A23D *5/04*

U.S. Cl. 426—545 **4 Claims**

1. An edible composition stablized against oxidative deterioration comprising a foodstuff and an amount of a polymeric maleimide sufficient to stabilize said foodstuff and inhibit its oxidative deterioration, said polymeric maleimide having *n* monomeric units comprising a plurality of



groups, wherein R and R′ independently are lower saturated alkyls of from 1 to 5 carbon atoms and *n* is an integer from 2 to about 2000.

4,078,092

APPLE JUICE COMPOSITIONS AND MILK-APPLE JUICE DRINK CONTAINING SUCH COMPOSITIONS

Kazuhiro Nishiyama, 14-7, Kamikotoen-1, Nishinomiya, Hyogo, Japan

Continuation-in-part of Ser. No. 645,528, Dec. 30, 1975, abandoned, which is a continuation-in-part of Ser. No. 508,535, Sep. 23, 1974, abandoned, and Ser. No. 326,110, Jan. 23, 1973, abandoned. This application Aug. 24, 1976, Ser. No. 717,140

Int. Cl.[2] A23L *2/02*

U.S. Cl. 426—584 **3 Claims**

1. A milk-apple juice drink having a pH of 3.6–4.5 and comprising milk, an aqueous solution of sweetener wherein the sweetener is used in sweetening amounts and apple juice composition, the volume ratio of said milk, aqueous solution of sweetener and apple juice composition being 3.0 – 5.0:6.5 – 4.5: 0.5, said apple juice composition comprising per 100 ml of composition 4.2 – 6.0 grams of sodium carboxymethyl cellulose, 10 – 50 grams of apple juice and 3.1 – 5 grams of aliphatic hydroxycarboxylic acid selected from the class consisting of citric acid, lactic acid, malic acid and tartaric acid.

4,078,093

HYPOALLERGENIC CHOCOLATE

Leonard S. Girsh, Benjamin Fox Pavilion, Old York and Township Line Rds., Jenkintown, Pa. 19046

Filed Oct. 12, 1976, Ser. No. 731,268

Int. Cl.[2] A23G *1/02, 1/00*

U.S. Cl. 426—593 **10 Claims**

1. A hypoallergenic chocolate prepared by the method comprising the steps of:

(a) denaturing substantially all of the protein allergens contained in cocoa powder; and

(b) mixing as separate ingredients said cocoa powder con-

taining denatured protein allergens with cocoa butter and sugar.

4,078,094

PROCESS FOR PRODUCING AN ANIMAL FEED AND FERTILIZER INGREDIENT FROM ANIMAL MANURE

Sol Katzen, Hanasi 62, Herzliya Pituach, Israel

Filed Sep. 15, 1976, Ser. No. 723,617
Claims priority, application Israel, Nov. 7, 1975, 48435
Int. Cl.[2] A23K *1/08*
U.S. Cl. 426—641 13 Claims

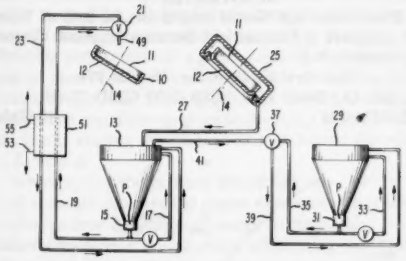
1. A process for producing an animal feed or a fertilizer ingredient from animal manure which comprises admixing an acid solution and either wet or dry manure whereby the essentially basic minerals contained in said manure and said acid chemically react, soluble salts being formed, said acid being used on an equal molar exchange or reaction basis with said essentially basic minerals so that said soluble salts are formed and so that sterilization of said manure is achieved, and a slurry containing various solid fractions and an acid-water fraction being formed, and recovering from said various fractions, each separated from each other, from said slurry.

4,078,095

SLURRY PROCESS FOR COATING PARTICLES UPON THE VIEWING-WINDOW SURFACE OF A CATHODE-RAY TUBE

John Michael Ratay, Peckville, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 28, 1974, Ser. No. 455,835
Int. Cl.[2] H01J *29/04*
U.S. Cl. 427—72 9 Claims



1. A method for coating the inner surface of a cathode-ray-tube viewing window with particulate material comprising

A. heating said window to temperatures above 35° C,

B. dispensing from a storage container onto said heated inner surface a quantity of slurry comprised of said particulate material mixed with a liquid vehicle, said quantity of slurry being in excess of that required for coating said surface and having at temperature below 22° C,

C. spreading said quantity of slurry over said surface, whereby amounts of heat are transferred to said quantity of slurry from said surface,

D. collecting the excess slurry from said surface and returning it to said storage container,

E. and removing the amounts of heat transferred to said excess slurry from said surface.

4,078,096

METHOD OF MAKING SENSITIZED POLYIMIDE POLYMERS, HAVING CATALYST AND ELECTROLESS METAL, METAL DEPOSITS THEREON AND CIRCUIT PATTERNS OF VARIOUS METALLIZATION SCHEMES

John Peter Redmond, Mechanicsburg; Albert Shirk, Palmyra; Elmer John Bottiglier, Harrisburg, and Richard Henry Zimmerman, Palmyra, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Continuation-in-part of Ser. No. 485,410, Jul. 3, 1974, abandoned. This application Sep. 20, 1976, Ser. No. 724,810
Int. Cl.[2] C23C *3/02*
U.S. Cl. 427—98 13 Claims

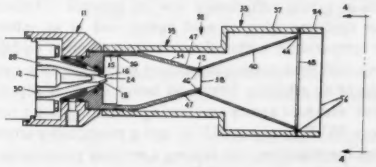
1. A method for electrolessly plating a pattern of metal on a polyimide film with good adhesion therebetween comprising the steps of: preconditioning said polyimide film by immersion in a hydrazine-alkali metal hydroxide solution to at least partially etch a surface of said film; neutralizing said surface by rinsing in a dilute hydrochloric acid solution; immersing said film thus preconditioned in tin-palladium solutions separately in sequential steps or in a mixture of these solutions; rinsing said film to wash off loosely held catalyst, immersing said film in an electroless metal plating bath; and depositing on said film a metal from said electroless metal plating bath on areas exposed to said catalytic material.

4,078,097

METALLIC COATING PROCESS

Ronald Lee Miller, Grand Rapids, Mich., assignor to International Prototypes, Inc., Wyoming, Mich.

Filed Jul. 9, 1976, Ser. No. 703,900
Int. Cl.[2] B05D *1/08, 3/10*
U.S. Cl. 427—34 6 Claims



1. A method for coating a plastic substrate with an atomized metal, the method comprising: continuously atomizing a metal in an electric discharge zone; continuously supplying metal to the electric discharge zone; continuously applying a gas pressure in excess of a gauge pressure of 120 pounds per square inch to the atomized metal to form a high pressure atomized metal spray; shaping the spray into a beam of contracted breadth; directing the spray away from the electric discharge zone through the area of contracted breadth and subsequently passing the spray through an enlarged area plate having have a plurality of fine apertures therethrough to effect breaking the spray into a high pressure shaped mist of such atomized particles; and directing the high pressure shaped mist against the plastic substrate, the plastic being a sufficient distance from the electric discharge zone to allow the mist to adequately cool so as not to warp the plastic substrate from excessive heat.

4,078,098

HIGH ENERGY RADIATION EXPOSED POSITIVE RESIST MASK PROCESS

Charles A. Cortellino, Wappingers Falls, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 28, 1974, Ser. No. 473,603
Int. Cl.[2] B05D *3/06*
U.S. Cl. 427—43 3 Claims

1. In the formation of patterned resist masks in which a layer of a methyl methacrylate polymer is coated on a substrate, exposed to radiation in a patternwise manner by a scanning

electron beam having an energy of from about 3 to 50KV to provide a dosage level of from about 3 to 30 microcoulombs per square centimeter, and the exposed portions removed from the substrate using methyl-isobutyl ketone which dissolves the exposed portions of the layer at a faster rate than the unexposed portions to produce a relief image of resist on said substrate, the improvement which comprises adding water to said ketone such that the water content of said ketone is from about 0.5% to about 2.2% by volume so as to increase the development rate.

4,078,099

ENCAPSULATED BLEACHES AND METHODS FOR THEIR PREPARATION

Louis R. Mazzola, Mahwah, N.J., assignor to Lever Brothers Company, New York, N.Y.

Filed Aug. 25, 1976, Ser. No. 717,718
Int. Cl.² B05D *7/00*
U.S. Cl. 427—213 **14 Claims**

1. A method for coating granulated agents, said agents being capable of substantially passing through a U.S. sieve size of about 10 mesh and at least about 80% of said agents being substantially retained on a U.S. sieve size of about 45 mesh comprising:

a. agitating said agents in a mixer sufficiently to insure thorough contact of a spray coating and containing said agitation throughout said spray coating;

b. spraying about 15 to about 25% of the total encapsulate weight of a melted solventless first coating on said agents to form a first coated agent, said spraying being accomplished initially at a rate and internal mixer temperature near the melting point of said coating sufficient to agglomerate any fines present in the agent and after said agglomeration at a rate sufficiently low to prevent substantial further agglomeration of said agents and at an internal mixer temperature within the softening range of said first coating, said first coating consisting essentially of a major portion of an alkanoic fatty acid being substantially nonreactive with said agents and having a melting point range of about 85° F to about 135° F and a plasticizing amount of a microcrystalline wax having a melting point range of about 125° F to about 210° F; and

c. spraying about 30% to about 40% of the total encapsulate weight of a melted solventless second coating on said first coated agent, at a rate sufficiently low to prevent substantial agglomeration of said first coated agent and at an internal mixer temperature within the softening range of said coating, said second coating consisting essentially of a major proportion of a fatty acid, a sufficient amount of said microcrystalline wax to plasticize said second coating and about 5 to about 20% of the total encapsulate weight of a polyoxyethylene-polyoxypropylene copolymer having at least about 65% by weight of polyoxyethylene and having a molecular weight of about 8000 to about 16,500, said second coating being reactive with said granulated agents.

4,078,100

COMPOSITE FOAM LAMINATE AND METHOD

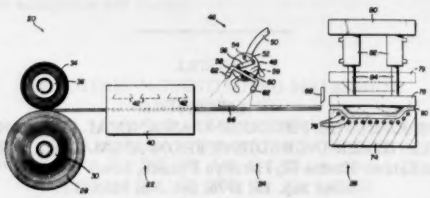
Ralph G. Doerfling, Southfield, Mich., assignor to Detroit Gasket Company, Oak Park, Mich.

Filed Oct. 29, 1974, Ser. No. 518,652
Int. Cl.² B05D *3/02*
U.S. Cl. 427—314 **13 Claims**

1. A method of permanently applying a plastic foam backing to a relatively porous substrate, including the steps of:

a. heating the relatively porous substrate to which the foam is to be applied;

b. applying a layer of foaming plastic in fluid form to the heated substrate surface, the plastic foam on the heated substrate providing a blow barrier at the foam-substrate interface;



c. completing the foaming of said foam plastic layer and curing into an integral homogeneous foam-substrate laminate.

4,078,101

FLAMEPROOFING OF TEXTILES

Robert Cole, Dudley, England, assignor to Albright & Wilson Ltd., Oldbury, England

Continuation of Ser. No. 386,574, Aug. 8, 1973, abandoned. This application Dec. 11, 1975, Ser. No. 639,695
Claims priority, application United Kingdom, Aug. 11, 1972, 37634/72
Int. Cl.² C09K *3/28*; C09D *5/18*
U.S. Cl. 427—341 **4 Claims**

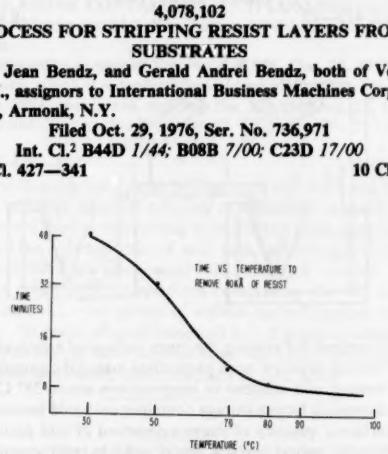
1. A process for flameproofing cellulosic textile fabric which comprises impregnating the fabric with an aqueous solution containing a pre-condensate of urea and a tetrakis hydroxymethyl phosphonium salt together with any excess of the tetrakis hydroxymethyl phosphonium salt necessary to make up a ratio of urea to tetrakis hydroxymethyl phosphonium lying between 0.05:1 and 0.25:1 molar, the solution being neutralised by the addition of an alkali or base to a pH in the range 5 to 8, and treating the impregnated fibres with ammonia to form a cross-linked polymer.

4,078,102

PROCESS FOR STRIPPING RESIST LAYERS FROM SUBSTRATES

Diana Jean Bendz, and Gerald Andrei Bendz, both of Vestal, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 29, 1976, Ser. No. 736,971
Int. Cl.² B44D *1/44*; B08B *7/00*; C23D *17/00*
U.S. Cl. 427—341 **10 Claims**



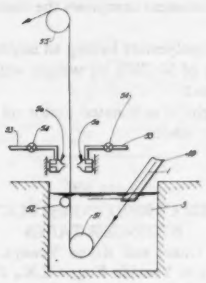
1. A process for removing an organic polymer resist layer from a substrate comprising treating the layer with a mixture consisting essentially of an alcoholic solution of an activator compound selected from the group consisting of ammonium, alkali metal, and alkaline earth metal hydroxides and carbonates and an aldehyde or ketone in proportions to provide between about 0.005 mole to 0.1 mole of activator compound per mole of aldehyde or ketone so as to remove said resist layer from said substrate.

4,078,103

METHOD AND APPARATUS FOR FINISHING MOLTEN METALLIC COATINGS

John A. Thornton, Los Angeles County, Calif., and Thomas A. Compton, Butler County, Ohio, assignors to Armco Steel Corporation, Middletown, Ohio

Continuation of Ser. No. 568,929, Apr. 17, 1975, abandoned. This application Oct. 18, 1976, Ser. No. 733,213
Int. Cl.[2] C23C 1/00
U.S. Cl. 427—349 12 Claims



1. In a method of finishing a molten metallic coating on a moving metallic strip, said metallic coating being chosen from the group consisting of zinc, aluminum, alloys of zinc, alloys of aluminum, and terne, wherein an elongated jet of gaseous fluid at subsonic velocity is discharged from a nozzle and caused to impinge across an upwardly moving coated strip substantially normal thereto at a point where the coating is molten and where the thickness of the coating is in excess of the desired final coating thickness, and wherein the narrow dimension of said jet is increased progressively from the center toward each edge thereof by contouring the narrow dimension of said nozzle, the improvement which comprises obtaining optimum finishing performance in a given finishing apparatus by adjusting the narrow dismension of the nozzle at the strip edge to the minimum practical value (d_{min}) with respect to clogging, reducing the nozzle-to-strip separation (Z_o) until no further reduction in coating thickness occurs, satisfying the relation

$Z_o = \phi$ d

where z_o = distance from nozzle to strip,

ϕ = length of near-field region expressed as a multiple of d,

d = narrow dimension of nozzle at strip edge,

calculating ϕ from $\phi = Z_o d\text{min}$, substituting the value of ϕ in the equation

$$t_{min} = K\phi(Ud_{min})^{\frac{1}{2}}\left[\left(\frac{P_O}{P_A}\right)^{\frac{\Gamma-1}{\Gamma}} - 1\right]^{-\frac{1}{2}}$$

where

t_{min} = minimum coating thickness

K = constant which depends on the viscosity of the molten coating metal, the efficiency of the nozzle, and the ratio of specific heats of the gaseous fluid

U = strip speed,

p_o = gas pressure in the nozzle plenum,

p_A = ambient (atmospheric) pressure,

γ = ratio of specific heats of the gaseous fluid, and minimizing the ratio $p_o p_A$ for a desired minimum coating thickness.

4,078,104

RELEASE COMPOSITION FOR BITUMINOUS MATERIALS

Eugene Ray Martin, Onsted, Mich., assignor to SWS Silicones Corporation, Adrian, Mich.

Filed Feb. 28, 1975, Ser. No. 554,299
The portion of the term of this patent subsequent to May 13, 1992, has been disclaimed.
Int. Cl.[2] B05D 3/02
U.S. Cl. 427—387 17 Claims

1.

A method for imparting release properties to a substrate which is in contact with bituminous materials which comprises (1) coating the substrate with a composition containing (a) an organopolysiloxane fluid of the general formula

$(R_2SiO)_n$

which is substantially free of hydroxyl groups and has a viscosity of from 5 to 1,000,000 cs. at 25° C. in which R represents a monovalent hydrocarbon radical having from 1 to 18 carbon atoms and n is a number greater than 20 and (b) from 0.1 to 90 percent by weight of an aminofunctional silicon fluid based on the total weight of the organopolysiloxane fluid and the aminofunctional silicon fluid and thereafter contacting said coated substrate with the bituminous materials.

4,078,105

AUTOMOBILE RINSING FORMULATIONS AND PROCESS FOR USING THE SAME

Sydney Harold Shapiro, Chicago; Dale Howard Johnson, Downers Grove, and Harold Charles Nemeth, Bolingbrook, all of Ill., assignors to Akzona Incorporated, Asheville, N.C.

Filed Feb. 15, 1977, Ser. No. 768,930
Int. Cl.[2] B05D 7/14, 3/12
U.S. Cl. 427—417 16 Claims

1. A pre-emulsion concentrate comprising

(a) from about 35 to about 70 percent emulsifiable mineral oil;

(b) from about 30 to about 50 percent cationic surfactant selected from the group consisting of fatty amido mono- or-di-amines, imidazolines, imidazolinium quaternaries, and di-fatty alkyl dimethyl quaternary ammonium compounds;

(c) from about 0 to about 10 percent of auxiliary emulsifier selected from the group consisting of polyethoxylated fatty alkyl amine containing from about 2 to about 15 ethylene oxide moities, the fatty alkyl group containing from about 12 to about 18 carbon atoms and;

(d) from about 4 to about 20 percent polyol selected from the group consisting of normal or branched chain saturated or mono-ethylenically unsaturated aliphatic diols containing from about 2 to about 10 carbon atoms and saturated aliphatic diols containing from 4 to about 15 carbon atoms and from 1 to about 4 ether linkages.

4,078,106

PILE WEATHERSEAL ENCLOSED IN U-SHAPED TUBE

Earl V. Lind, Rochester, N.Y., assignor to Schlegel Corporation, Rochester, N.Y.

Division of Ser. No. 597,408, Jul. 21, 1975, Pat. No. 4,028,456. This application Mar. 21, 1977, Ser. No. 779,757
Int. Cl.[2] D02G 3/00
U.S. Cl. 428—35 2 Claims

1. A weatherseal comprising:

(a) a relatively thick, flat resin base formed as a long narrow strip;

(b) a long, narrow strip of pile material secured to one face surface of said resin base and extending along a longitudinal central region of said base; and

(c) a relatively thin-walled resin tube U-shaped in cross section and joined to opposite side edge regions of said

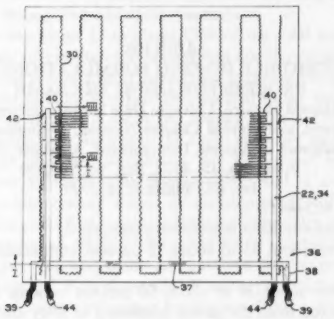
one face surface of said support portion and arching over said strip of pile material.

4,078,107

LIGHTWEIGHT WINDOW WITH HEATING CIRCUIT AND ANTI-STATIC CIRCUIT AND A METHOD FOR ITS PREPARATION

Michael G. Bitterice, New Kensington, and Leroy D. Keslar, Natrona Heights, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 28, 1976, Ser. No. 700,239
Int. Cl.[2] B64D *15/12*; H05B *3/34*; B32B *27/40, 17/04*
U.S. Cl. 428—38 **12 Claims**



1. A composite transparency comprising an outer layer of rigid transparent plastic selected from the class consisting of polycarbonate and acrylic plastic having a first circuit element comprising relatively widely spaced wire runs embedded adjacent one major surface thereof, an inner layer of hard transparent plastic selected from the class consisting of polycarbonate and acrylic plastic fused to the other opposite major surface of said outer layer and a second circuit element comprising relatively closely spaced wire runs embedded adjacent the fused surfaces of said layers in spaced relation to said first circuit element in the direction of the thickness of said transparency, terminal means connected to said first circuit and adapted for connection to a ground to enable said first circuit to operate as an anti-static circuit when so connected, additional terminal means connected to said second circuit and adapted for connection to a voltage source to enable said second circuit to operate as a heating circuit when so connected.

10. A transparency comprising a layer of rigid transparent plastic taken from the class consisting of acrylic resins and polycarbonates having a first major surface adapted for exposure to the atmosphere and a circuit element comprising a plurality of wire runs embedded within and covered by said layer in closely spaced relation to said first major surface at a maximum depth of 5 mils (0.13 millimeter) and terminal means connected to said wire and adapted for connection to ground to enable said circuit element to comprise part of a static charge dissipation circuit when connected as adapted for connection.

4,078,108

ADHESIVE LAYER FOR X-RAY INTENSIFYING SCREENS ON POLYETHYLENE TEREPHTHALATE SUPPORT LAYERS

Wilhelm Brandstätter, Munich; Gerhard Haschka, Schrobenhausen, and Herbert Heindze, Hohenschaeftlarn, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 22, 1976, Ser. No. 669,286
Claims priority, application Germany, Mar. 26, 1975, 2513258
Int. Cl.[2] B32B *5/16, 27/36*
U.S. Cl. 428—480 **8 Claims**

1. A laminate providing a screen for intensifying in x-ray radiography comprising a flexible polyethylene terephthalate support layer, an adhesive layer and a fluorescent layer wherein the improvement comprises the binder in the adhesive layer consists of

polyesters or copolyesters having an isophthalate content in the polyester of 30–75% by weight with at least one aliphatic diol; and

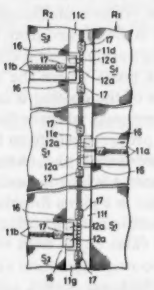
2–35% by weight of sulfonated castor oil based on the dry weight of the binder.

4,078,109

BUTT-JOINED CARPET CONSTRUCTION WITH STRINGER TAPES

Akiyoshi Kando, Uozu, and Kiyoo Yoneya, Kurobe, both of Japan, assignors to Yoshida Kogyo K.K., Japan

Filed Apr. 19, 1977, Ser. No. 788,917
Claims priority, application Japan, Apr. 23, 1976, 51-51677[U]
Int. Cl.[2] B32B *3/02*
U.S. Cl. 428—62 **5 Claims**



1. A carpet construction comprising:

(a) a plurality of rows of square sheet materials butt-jointed together to jointly provide a continuous planar upper surface, said sheet materials in each row having the same width and being joined together end to end, each two adjacent rows of sheet materials being butt-jointed together at one of their lateral edges, and said sheet materials in said each two adjacent rows being disposed in such a manner that the abutting lines of one of each adjacent rows of sheet materials are disposed out of registration with those of the other, respectively;

(b) a plurality of stringer tapes fixedly secured respectively to the lower marginal portions of said plurality of rows of sheet materials adjacent their abutting ends and edges except for their opposite end portions, each of said stringer tapes carrying a row of fastener elements along one longitudinal edge thereof, said rows of fastener elements of the respective opposed stringer tapes being coupled together and holding said plurality of rows of sheet materials in butt-jointed condition, and each adjacent stringer tapes secured to each of said sheet materials hav-

ing their one end portions disposed in partially overlapped relation; and

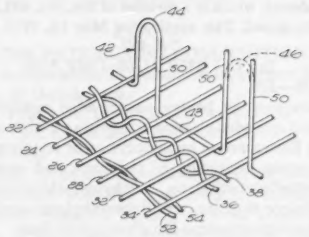
(c) a plurality of means secured respectively to said coupled fastener elements immediately adjacent to said end portions and positively holding the same in coupled relation.

4,078,110

FLEXIBLE PILE THERMAL BARRIER INSULATOR

James C. Fletcher, administrator of the National Aeronautics and Space Administration, with respect to an invention of George Edward Anderson, Lynwood; Donald Maurice Fell, Downey, and Jerry Stanley Tesinsky, San Pedro, all of Calif.

Filed Apr. 28, 1976, Ser. No. 681,000
Int. Cl.[2] B32B *3/02*
U.S. Cl. 428—93 **7 Claims**



1. A flexible pile thermal barrier insulator formed of material having high temperature capability comprising:

a plurality of upstanding pile yarns having free ends;

a backing section for supporting said upstanding yarns comprising:

a plurality of filler yarns forming a mesh in the first detection, said pile yarns being formed of a plurality of U-shaped loops having a pair of upstanding arms extending from said backing section to said free ends and a base interconnecting said arms within said backing section, said base extending perpendicular to said filler yarns for a distance greater than three filler yarns to form a woven pattern;

a plurality of warp yarns looped around said filler yarns in said backing section and forming a mesh in a second direction;

a plurality of stuffer yarns looped adjacent alternate filler yarns for displacing said alternate filler yarns in a vertical direction and enabling said pile yarns to maintain a vertical integrity; and

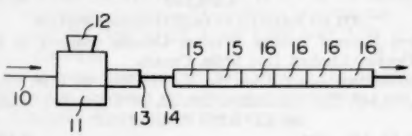
binder means for preventing separation of said yarns of said backing section.

4,078,111

PROCESS OF EXTRUSION-COATING THE CENTRAL CORE WITH AN INSULATOR OF HIGH PRESSURE-PROCESSED POLYETHYLENE

Koji Yamaguchi, Tokyo; Hideaki Takashima, Chiba; Iwao Tsurutani, Ichihara, and Toshio Nagasawa, Kyoto, all of Japan, assignors to UBE Industries, Ltd., Japan

Filed May 20, 1976, Ser. No. 688,264
Claims priority, application Japan, Jan. 6, 1976, 51-100
Int. Cl.[2] H01B *3/30, 13/14*
U.S. Cl. 427—120 **6 Claims**



1. A process of extrusion-coating the central core, for use in a submarine coaxial cable for communication with alternating current signals having a maximum frequency of not less than 30 MHz, with an insulator of high pressure-produced polyethylene having a density of from 0.925 to 0.940 g/cm^3 and melt index of from 0.01 to 0.3 g/10 min, comprising the steps of:

(a) extruding the central core covered with the insulator of polyethylene from an extruder, wherein a temperature of the polyethylene at the extrusion outlet is in the range of from 170° to 200° C;

(b) just after extrusion into the atmosphere, immersing, and moving the extruded insulator-covered-core through a first group of at least one cooling water trough containing cooling water of a temperature which is in the range of from 80° to 100° C and is lower than the melting point of the polyethylene by a difference of from 10° to 30° C, thereby cooling the extruded insulator-covered-core gradually for about 10 to 30 minutes, and;

(c) further, moving said insulator-covered-core through a second group of at least two cooling water troughs, thereby cooling the insulator-covered-core gradually to room temperature.

4,078,112

COATING MODIFICATION PROCESS FOR ULTRAFILTRATION SYSTEMS

Alexander Armand Bibeau, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed Jul. 12, 1976, Ser. No. 704,532
Int. Cl.[2] B01D *31/00*
U.S. Cl. 427—444 **5 Claims**

1. A process for the stabilization of coatings of metal oxide particles on substrates which coated substrates are useful in ultrafiltration systems for the separation and concentration of components contained in liquids, said metal of said metal oxide being selected from the group consisting of one or more of beryllium, magnesium, calcium, aluminum, titanium, strontium, yttrium, lanthanum, zirconium, hafnium, thorium, iron, manganese and silicon, said process comprised of contacting the metal oxide coated substrate while still in the wet state and prior to its use for separating and concentrating components contained in liquids, with water vapor at a humidity of at least about 50 percent and at a temperature of at least about 80° C for a period of time sufficient to stabilize the metal oxide coating from any substantial erosion when employed for ultrafiltration purposes.

4,078,113

METHOD OF PRODUCING CERTAIN TRANSPARENT ADHESIVE LAUROLACTAM COPOLYAMIDE FILMS

Herman S. Starbuck; William Raymond Jones, and John Edward Mahn, all of Cincinnati, Ohio, assignors to General Fabric Fusing, Inc., Cincinnati, Ohio

Filed Nov. 17, 1975, Ser. No. 632,417
Int. Cl.[2] B29B *3/02;* **B32B** *27/08, 27/12, 27/34*
U.S. Cl. 428—196 **15 Claims**

1. In combination, a transparent adhesive film of a resin consisting essentially of a mixed polyamide condensation product of laurolactam monomer and a co-condensible monomer member selected from the group consisting of caprolactam, hexamethylene diamine adipate, hexamethylene diamine sebacate and mixtures thereof, said laurolactam in amounts of from 80% to 20% by weight and said co-condensible monomer member in amounts of 20% to 80% by weight, said resin having a substantially reduced amount of unreacted monomers, said film having upper and lower surfaces; and

substrate material means having a surface thereon, the lower surface of said film adhesively hot melted to said surface of said substrate material means.

4. A transparent film of a resin consisting essentially of a mixed polyamide condensation product of laurolactam monomer and a co-condensible monomer member selected from the group consisting of caprolactam, hexamethylene diamine adi-

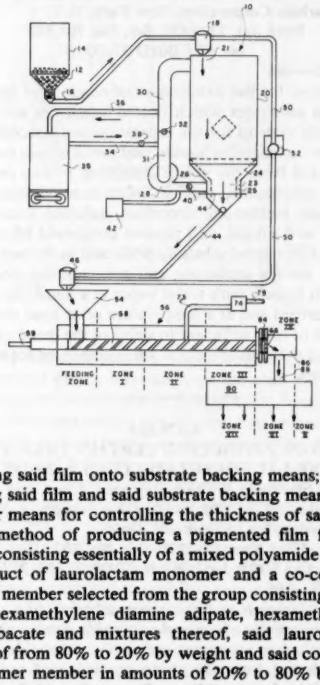
pate, hexamethylene diamine sebacate and mixtures thereof, said laurolactam in amounts of from 80% to 20% by weight and said co-condensible monomer member in amounts of 20% to 80% by weight, said transparent film having a substantially reduced amount of unreacted monomers.

8. A method of producing a transparent film from resin particles consisting essentially of a mixed polyamide condensation product of laurolactam monomer and a co-condensible monomer member selected from the group consisting of caprolactam, hexamethylene diamine adipate, hexamethylene diamine sebacate and mixtures thereof, said laurolactam in amounts of from 80% to 20% by weight and said co-condensible monomer member in amounts of 20% to 80% by weight, said film suitable as a coating and heat activated adhesive, said method comprising:

drying said resin while in the solid state until the surface thereof is substantially water free;

extruding said dried resin through an extruder while heating said resin until molten and to a temperature sufficient substantially to volatilize and drive off the unreacted monomer contaminants present, but below the degradation temperature of said resin;

expelling said molten resin from said extruder into heated, sheeting die means for additional heating thereof, for driving off further said unreacted monomer contaminants, and for forming a film thereby from said molten resin;



dropping said film onto substrate backing means; and

running said film and said substrate backing means through roller means for controlling the thickness of said film.

15. A method of producing a pigmented film from resin particles consisting essentially of a mixed polyamide condensation product of laurolactam monomer and a co-condensible monomer member selected from the group consisting of caprolactam, hexamethylene diamine adipate, hexamethylene diamine sebacate and mixtures thereof, said laurolactam in amounts of from 80% to 20% by weight and said co-condensible monomer member in amounts of 20% to 80% by weight, said film suitable as a coating and hot melt adhesive, said method comprising:

drying said resin while in the solid state until the surface thereof is substantially water free;

mixing into said dried resin a concentrate of dry resin and dried pigment;

extruding said resin and concentrate mixture through an extruder while heating until molten said resin and concentrate in said extruder and to a temperature sufficient substantially to volatilize and drive off the unreacted monomer contaminants present, but below the degradation temperature of said resin;

expelling said molten resin from said extruder into heated sheeting die means for additional heating thereof, for further driving off said unreacted monomer contaminants, and for forming a film thereby from said molten resin;

dropping said film onto substrate backing means; and

running said film and said substrate backing means through roller means for controlling the thickness of said film.

4,078,114

WIRE COATED WITH DIALLYL ESTERS OF DICARBOXYLIC ACIDS

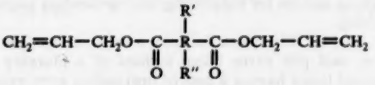
Elihu J. Aronoff, Framingham, and Kewal Singh Dhami, Shrewsbury, both of Mass., assignors to International Telephone and Telegraph Corporation, New York, N.Y.

Division of Ser. No. 670,693, Mar. 26, 1976, Pat. No. 4,051,003, which is a continuation of Ser. No. 489,697, Jul. 18, 1974, abandoned, which is a division of Ser. No. 401,973, Oct. 1, 1973, abandoned. This application May 16, 1977, Ser. No. 797,487

Int. Cl.² B32B *15/08*; C08F *8/00*

U.S. Cl. 428—379 **2 Claims**

1. A wire product having an extruded insulation coating thereon, said extruded coating comprising a high temperature processing fluorocarbon homopolymer or copolymer selected from the group consisting of polymers and copolymers of ethylene-tetrafluoroethylene, ethylene-chlorotrifluoroethylene, vinylidene fluoride, tetrafluoroethylene-vinylidene fluoride, tetrafluoroethylene-hexafluoropropylene, vinylidene fluoride-hexafluoropropylene, vinylidene fluoride-hexafluoropropylene-tetrafluoroethylene and mixtures thereof having incorporated therein a crosslinking coreactant compound comprising a diallyl ester having the structural formula:



wherein R is an organic radical consisting from 4 to 20 carbon atoms and is selected from the group consisting of alkyl radicals, cycloalkyl radicals and mixed alkyl-cycloalkyl radicals; R′ and R″ are independently selected from hydrogen, alkyl, cycloalkyl, aralkyl and aryl radicals and mixtures thereof; and the total carbon atoms in R, R′ and R″ is from 10 to 34.

4,078,115

BONDING OF RUBBER TO REINFORCING ELEMENTS

Heimo J. Langer, Columbus, Ohio, and William J. McKillip, Crystal Lake, Ill., assignors to Ashland Oil, Inc., Ashland, Ky.

Division of Ser. No. 562,261, Mar. 26, 1975, Pat. No. 3,993,836. This application Jun. 24, 1976, Ser. No. 699,579

Int. Cl.² B32B *27/34*; D02G *3/00*

U.S. Cl. 428—395 **1 Claim**

1. A rubber-enforcing element in the form of a filamentary substrate of polyester having a first coating of the in situ reaction product of a polyepoxide and a quaternized copolymer of 4-vinylpyridine and an aminimide selected from the group consisting of dimethyl-(2-hydroxypropyl)amine methacrylimide and trimethyl amine methacrylimide, and a heat-cured second coating of a Resorcinol/Formaldehyde Condensate-Latex adhesive.

4,078,116

SOLID PAINTS COATED SUBSTRATES

Alfred Norman Dunlop, Weston, Canada, assignor to SCM (Canada) Limited, Don Mills, Canada

Continuation-in-part of Ser. No. 534,827, Dec. 20, 1974, Pat. No. 3,994,849. This application Oct. 12, 1976, Ser. No. 731,129

Int. Cl.² B32B *15/08, 21/08*

U.S. Cl. 428—431 **10 Claims**

1. A substrate coated with a dimensionally stable solid paint composition comprising the admixture of:

a. a solution of a curable polymer resin having a molecular weight ranging from 1,000 to 7,000 and sufficient reactive acid functional groups selected from the group consisting of carboxylic, sulfonic and phosphonic to provide an acid number from 20 to 80, said resin dissolved in a non-polar solvent to provide a 25 to 90 weight percent solution; and

b. an ionic cross-linking agent selected from the group consisting of metal hydroxide, ammonium hydroxide, or an organic cation former dissolved in a polar solvent of high dielectric strength to provide a 10–50 weight percent solution or suspension;

wherein said composition contains metal hydroxide, ammonium hydroxide, or organic cation former in excess of, from 100 to 600 mole percent, the amount required to neutralize said reactive acid group of the resin.

4,078,117
CONCRETE CURING COMPOSITION

Charles Bryce Hutchison, El Dorado, Ark., assignor to Lion Oil Company, El Dorado, Ark.

Filed Nov. 13, 1975, Ser. No. 631,670
Int. Cl.[2] B32B *11/04;* **C08L** *95/00*
U.S. Cl. 428—446 **12 Claims**

1. A method for producing a cured concrete having a non-toxic, continuous, void-free and erosion resistant coating thereon which comprises coating uncured concrete with a composition in an erosion preventive effective amount, said composition comprising a major amount of at least one catalytically air-blown asphalt having a penetration at 77° F. of about 21 to 26 in tenths of millimeters and as measured by ASTM D5-73 and a softening point of about 195° to about 205° F., and sufficient minor amounts of at least one plasticizer and at least one solvent for the catalytically air-blown asphalt to produce a cured coating having a ductility of about 5 to 12 cm., and toxicity level of less than 18 mg/sq. inch of surface exposed under the ANSI Test.

5. A composition comprising a major amount of at least one catalytically air-blown asphalt having a penetration at 77° F. of about 21 to 26 in tenths of millimeters and as measured by ASTM D5-73 and a softening point of from about 195° to 205° F. and from about 1% to 3% by weight of a plasticizer and at least one solvent for said asphalt, said solvent having an IBP of not more than about 250° F. or an EBP of more than about 360° F. but not more than about 450° F.

8. Cured concrete coated with an erosion preventive effective amount of a composition comprising a major amount of at least one catalytically air-blown asphalt having a penetration at 77° F. of about 21 to 26 in tenths of millimeters and as measured by ASTM D5-73 and a softening point of about 195° to about 205° F., and a sufficient minor amount of at least one plasticizer for said catalytically air-blown asphalt to produce a cured coating having a ductility of about 5 to 12 cm., said cured coating having a toxicity level of less than 18 milligrams per square inch of coated surface exposed under the ANSI Test.

4,078,118
PENTAERYTHRITOL ESTERS OF MERCAPTO ACIDS PLUS LONG CHAIN FATTY ACIDS

Joseph Donald Moyer, Silver Spring, and David Edward Kramm, Laurel, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

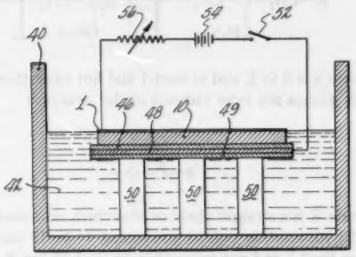
Division of Ser. No. 623,216, Oct. 16, 1975, Pat. No. 4,039,723. This application Mar. 23, 1977, Ser. No. 780,566
Int. Cl.[2] C08L *81/02, 91/00;* **C08F** *2/46, 2/50*
U.S. Cl. 428—521 **6 Claims**

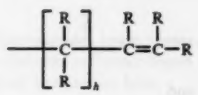
1. A curable composition useful for obtaining a solid polythioether having improved slip properties comprising:

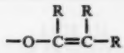
A. a polyene component of the formula:

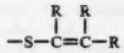
$$[A—X)_m$$

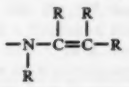
wherein m is an integer of at least 2, wherein X is a member selected from the group consisting of:



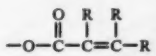
(a)


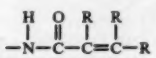
(b)


(c)


(d)


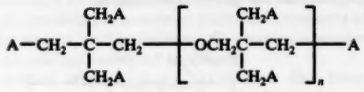
(e)

(f)


(g)


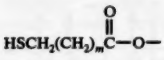
where h is an integer from 1 to 9; R is a radical selected from the group consisting of hydrogen, fluorine, chlorine, furyl, thienyl, pyridyl, phenyl and substituted phenyl, benzyl and substituted benzyl, alkyl and substituted alkyl, alkoxy and substituted alkoxy, cycloalkyl and substituted cycloalkyl; said substituents on said substituted members selected from the group consisting of nitro, chloro, fluoro, acetoxy, acetamide, phenyl, benzyl, alkyl, alkoxy and cycloalkyl; said alkyl and alkoxy having from one to nine carbon atoms and said cycloalkyl having from three to eight carbon atoms; wherein [A] is free of reactive carbon-to-carbon unsaturation; free of highly water-sensitive members; and is a polyvalent chemically compatible member of the group consisting of carbonate, carboxylate, carbonyl, ether, silane, silicate, phosphonate, phosphite, phosphate, alkyl and substituted alkyl, cycloalkyl and substituted cycloalkyl, aryl and substituted aryl, urethane and substituted urethane, urea and substituted urea, amine and substituted amine, amide and substituted amide, hydroxyl, heterocyclic carbon containing radical, and mixtures thereof; said substituents on said members being defined above, said component having a molecular weight in the range from about 64 to 20,000; and a viscosity in the range from essentially 0 to 20 million centipoises at 70° C; and,

B. pentaerythritol ester component of the formula:



wherein n is 0 to 2, and at least 1 and not more than $2n + 2$ of the A groups are ester radicals of the structure

wherein R is a straight chain or branched, saturated or unsaturated hydrocarbon radical containing 11 to 19 carbon atoms, and at least 2 and not more than $2n + 3$ of the A groups are ester radicals of the structure



wherein m is 0 to 1 and

C. a photosensitizer.

4,078,119

METHOD FOR CATALYZING A FUEL CELL ELECTRODE AND AN ELECTRODE SO PRODUCED

Murray Katz, Newington, and Arthur Kaufman, Bloomfield, both of Conn., assignors to United Technologies Corporation, East Hartford, Conn.

Division of Ser. No. 533,918, Dec. 18, 1974, Pat. No. 3,932,197, which is a division of Ser. No. 645,692, Jan. 2, 1976, Pat. No. 3,979,227. This application May 17, 1976, Ser. No. 686,780

Int. Cl.² H01M 4/04

U.S. Cl. 429—13 **10 Claims**

1. A process for pre-wetting a conducting particle, hydrophobic bonded, substrate supported, gas diffusion electrochemical cell electrode by causing electrolyte to wet the conducting particles in the hydrophobic-bonded portion of said electrode which comprises:

(a) exposing the dry conducting particle, hydrophobic-bonded portion of said electrode to said electrolyte while maintaining said substrate substantially unexposed to said electrolyte,

(b) applying an external electrical potential across the electrode between the substrate and the electrolyte, the potential being of sufficient magnitude to increase the rate at which the electrolyte enters and wets the conducting particle portion of said electrode,

(c) maintaining said potential for a period of time sufficient to substantially completely wet the conducting particle portion of said electrode, and

(d) removing said external electrical potential.

4,078,120

STABILIZED IRON ELECTRODES

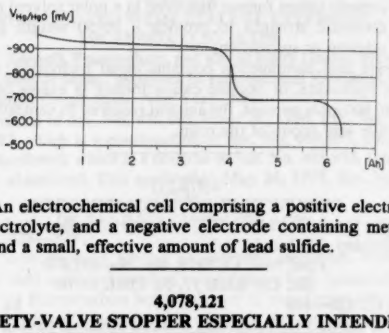
Olle Birger Lindstrom, Lorensviksv. 14, 183 63 Taby, Sweden

Filed May 12, 1976, Ser. No. 685,648

Claims priority, application Sweden, May 12, 1975, 75 05446

Int. Cl.² H01M 4/00

U.S. Cl. 429—27 **9 Claims**



1. An electrochemical cell comprising a positive electrode, an electrolyte, and a negative electrode containing metallic iron and a small, effective amount of lead sulfide.

4,078,121

SAFETY-VALVE STOPPER ESPECIALLY INTENDED FOR ELECTRIC STORAGE BATTERIES

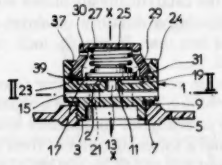
Claude Alain Gratzmuller, 30 Av.Georges Mandel, 75116 Paris, France

Filed Jun. 21, 1976, Ser. No. 697,789

Claims priority, application France, Jun. 26, 1975, 75 20025

Int. Cl.² H01M 2/12

U.S. Cl. 429—54 **5 Claims**



1. A storage battery vent plug for closing a filler opening in a battery cell cover, comprising in combination a body member and an apertured hood member associated therewith, said body member having a normally horizontal wall, a first annular flange extending downwardly from said wall and adapted for attachment to said battery cell cover, a second annular flange extending upwardly from said wall and provided with an inner annular clamping surface, said second annular flange terminating in a circular row of resilient teeth each having a cone-shaped inner surface portion longitudinally spaced from said annular clamping surface, said hood member having a circular top wall and a flange depending therefrom, said depending flange providing an annular clamping end surface in opposition to said clamping surface of the body member, a central boss formed on the upper face of said first wall, an outlet port disposed centrally of said boss, an annular valve seating surface on said boss about said outlet port, a flexible diaphragm constituting a valve member and having its periphery clamped between the said clamping surfaces of the body member and the hood member, said diaphragm being normally in seating contact with said valve seating surface so as to define with said first wall and said second flange an annular pressure chamber about said boss, an inlet duct formed in said first wall for establishing a communication between said pressure chamber and the interior of said first flange, an exhaust duct formed in said first wall for establishing a communication between said outlet port and the atmosphere, a circular backing plate structure for said diaphragm resting against the upper face thereof, a calibrated spring disposed between said plate structure and said hood member for yieldingly holding the diaphragm

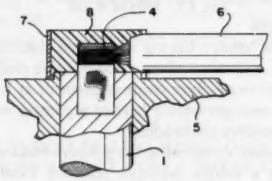
against said seating surface but to allow the diaphragm to flex so as to permit gas flow through said outlet port only while the incoming gas from within the battery is at a pressure above a predetermined amount, and an annular ridge formed by two lower cone-shaped outer surface portions of said depending flange of the hood member, said ridge being adapted to axially engage said row of resilient teeth and radially flex said resilient teeth of the second flange so as to be received within the annular space left between the diaphragm and said row of resilient teeth, whereupon the cone-shaped inner surface portion of each of the radially deformed teeth is effective to exert on the inclined upper surface portion of said ridge a pressure tending to urge said hood member towards and maintain it in the proper diaphragm clamping position with a component force due to the resiliency of said teeth.

4,078,122

BATTERY TERMINAL CONSTRUCTION

Ulrich Lötzsch, and Heinz Schuster, both of Hagen, Germany, assignors to Varta Batterie Aktiengesellschaft, Germany

Filed Jul. 15, 1976, Ser. No. 705,515
Claims priority, application Germany, Jul. 29, 1975, 7524020
Int. Cl.² H01M *2/30*
U.S. Cl. 429—121 **11 Claims**



1. A lead storage battery having terminals made of lead and characterized in that;

the terminals have inserts made of metal having lower electrical resistance and higher mechanical strength than lead,

the inserts having a portion protruding from the top of the terminal,

the protruding portion being in the shape of a tubular loop with axis at an angle to the axis of the terminal.

4,078,123

SPIRAL-WRAPPED MULTI-LAYER CELL SEPARATOR

Ullrich Costenoble, Ellwangen, Germany, assignor to Varta Batterie Aktiengesellschaft, Germany

Filed Dec. 23, 1976, Ser. No. 753,855
Int. Cl.² H01M *2/18*
U.S. Cl. 429—141 **9 Claims**

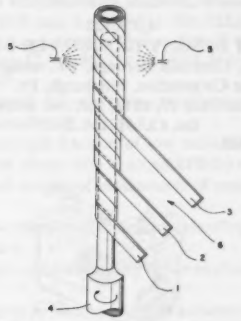
1. The method of manufacturing a separator sleeve for a galvanic element, comprising:

spirally wrapping upon a mandrel an inner layer of separator foil,

spirally wrapping directly upon said inner layer so as to cover at least the adjoining edges of the inner layer an intermediate layer of a synthetic plastic foil which is substantially solid and non-adhesive in the state in which it is wrapped but which is soluble and becomes adhesive without the application of external pressure or heat in response to an activating liquid,

spirally wrapping directly upon the intermediate layer an outer layer of separator foil, and

applying said activating liquid in the absence of external pressure or heat,



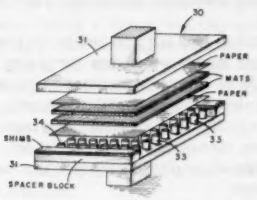
whereby the intermediate layer becomes adhesive and securely joins the inner and outer layers without the application of external pressure or heat.

4,078,124

LAMINATED NON-WOVEN SHEET

James S. Prentice, Joliet, Ill., assignor to Exxon Research & Engineering Co., Linden, N.J.

Continuation-in-part of Ser. No. 864,994, Oct. 9, 1969, Pat. No. 3,715,251, and Ser. No. 291,127, Sep. 21, 1972, Pat. No. 3,795,571, which is a division of Ser. No. 864,994,. This application Nov. 6, 1972, Ser. No. 304,282
The portion of the term of this patent subsequent to Feb. 6, 1990, has been disclaimed.
Int. Cl.² B32B *7/14, 31/00;* D04H *1/00*
U.S. Cl. 429—144 **6 Claims**



1. A process for making a strong tear-resistant, non-woven sheet battery separator having a strip tensile strength of at least 400 dm^2, which comprises the steps of:

a) forming at least two dissimilar non-woven mats (A) and (B) comprised of the same thermoplastic polymer fibers and made by a melt-blown process, but having major differences in tear strength and tensile strength properties; and

b) laminating at least one mat (A) with at least one mat (B), wherein said mat (A) has a strip tensile strength greater than 5000 m and a tear resistance of less than 300 dm^2, and wherein said mat (A) has been prepared with air/polymer rates of more than 140, has a relatively high degree of self-bonding and has a fiber diameter of from 1 to 10 microns; and said mat (B) has a tear resistance of at least 1000 dm^2 and a tensile strength of less than 2000 m and wherein said mat (B) has been prepared with air to polymer rates of less than 50, has fiber diameters of about 10 to 40 microns and is relatively low in self-bonding but high in entanglements, wherein said mat (A) having the high strip tensile strength is obtained by heating under pressure at a temperature between about 270° to about 320° F and said mat (B) having a tear resistance at least 1000 dm^2 is ob-

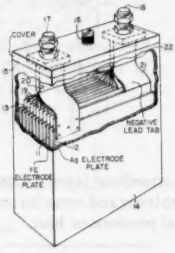
tained by heating under pressure at temperatures between about 200° to about 245° F.

4,078,125

ENERGY DENSITY IRON-SILVER BATTERY

Jack T. Brown, Churchill Borough, Pa., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed May 27, 1976, Ser. No. 690,444
Int. Cl.[2] H01M 2/16
U.S. Cl. 429—145 **15 Claims**



1. An iron-silver battery comprising a case and a cover within which are disposed:
   1. at least one positive electrode plate comprising:
      a. a porous supporting plaque comprising silver, having active electrode material consisting essentially of silver distributed thereon,
      b. an electrical lead tab attached to the plaque,
   2. at least one negative electrode plate comprising:
      a. a flexible, expansible, porous supporting plaque comprising contacting metal fibers, having active electrode material comprising iron oxide particles distributed upon and disposing within the pore volume of the plaque,
      b. an electrical lead tab attached to the plaque,
   3. at least one separator between the plates, said separator being made of a material resistant to chemical attack by the electrolyte or ions contained therein, and having a multilayer structure of a microporous layer and a layer of larger pore size or about 60% to about 90% porosity, wherein the silver plate is disposed next to 60% to 90% porous layer,
   4. an alkaline electrolyte, and
   5. means for making electrical connections to the respective plates; wherein the separator is effective to allow silver ion diffusion while limiting formation of a silver conducting film on the separator.

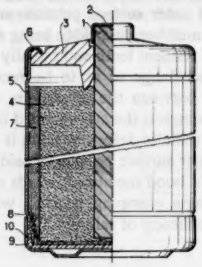
4,078,126

ELECTRIC CELL

Claude Lechevallier, Amfreville la Campagne, France, assignor to Compagnie Industrielle des Piles Electroniques "CIPEL", Levallois-Perret, France

Filed Jun. 14, 1977, Ser. No. 806,351
Claims priority, application France, Jun. 30, 1976, 76 19904
Int. Cl.[2] H01M 6/08
U.S. Cl. 429—166 **6 Claims**

1. An electric cell in which at least the positive active material and the electrolyte are contained in a receptacle partially formed by the negative electrode, said negative electrode being in the form of a tube, a metal cup fitted at one end of said tube, said cup being shaped to provide a bottom part with an up-standing cylindrical wall and constituting the bottom of the receptacle and the negative output terminal of the cell, characterized in that the wall of said tube is continuous, a sealing gasket interposed between the tube and a portion of said metal cup so as to leave at least part of the height of said cylindrical wall of the cup bare whereby a portion of said wall is in direct



electrical contact with the tube, and said gasket provides a seal between the tube and a portion of the well of the cup.

4,078,127

ADDITIVE FOR AN ALKALINE BATTERY EMPLOYING DIVALENT SILVER OXIDE POSITIVE ACTIVE MATERIAL

El Sayed Megahed, and Carol Buelow, both of Madison, Wis., assignors to ESB Incorporated, Philadelphia, Pa.

Filed Apr. 21, 1977, Ser. No. 789,471
Int. Cl.[2] H01M 6/06
U.S. Cl. 429—206 **10 Claims**

1. An alkaline battery having a negative electrode, an alkaline electrolyte, a divalent silver oxide positive electrode material having a divalent silver oxide content of at least 50% by weight, and a semi-permeable barrier separator between said negative and positive electrodes,

the improvement comprising the positive electrode material containing a sulfide additive selected from the group consisting of cadmium sulfide, calcium sulfide, mercury sulfide, tin sulfide, tungsten sulfide and mixtures thereof.

4,078,128

PROCESS FOR RENDERING ETHYLENE-VINYL ACETATE COPOLYMERS AGGLOMERATION-RESISTANT

John M. Hoyt; Karl Koch, both of Cincinnati, and Joseph Fischer, Fairfield, all of Ohio, assignors to National Distillers and Chemical Corporation, New York, N.Y.

Continuation of Ser. No. 585,421, Jun. 9, 1975, abandoned. This application Sep. 9, 1976, Ser. No. 721,744
Int. Cl.[2] C08F 8/12
U.S. Cl. 526—10 **2 Claims**

1. A process for deagglomerating previously agglomerated mass of an ethylene-vinyl acetate copolymer comprising from 35 to 60% by weight of vinyl acetate, comprising:
   a. treating agglomerates of the copolymer while at a temperature of from 20° to 60° C, with an alkaline liquid medium incorporating from 3 to 60% by weight of an alkali metal hydroxide or alkali metal alkoxide in a diluent selected from the group consisting of water, a water-miscible lower alkanol and mixtures thereof, which medium does not dissolve the ethylene-vinyl acetate copolymer;
   b. maintaining the medium at a temperature of from 10° to 100° C in contact with the pellets while agitating the medium for a period of at least 5 seconds to at least partially hydrolyze the vinyl acetate groups on the surface of said copolymer but to hydrolyze no more than 10% by weight of the vinyl acetate groups originally present in the copolymer, to deagglomerate the copolymer;
   c. washing the deagglomerated, treated pellets with an aqueous wash medium to remove therefrom any residual alkali metal hydroxide or alkoxide; and

d. drying the treated, agglomeration-resistant pellets thereby formed.

4,078,129

PROCESS FOR SEPARATING POLYVINYL ALCOHOL FROM ITS SOLUTION

Totaro Yamagata, Suzuka, and Shuji Banno, Konan, both of Japan, assignors to Shikibo Limited, Osaka, Japan

Filed Dec. 19, 1975, Ser. No. 642,341
Claims priority, application Japan, Dec. 20, 1974, 49-147125
Int. Cl.[2] C08F *6/12*
U.S. Cl. 526—11 4 Claims

1. A process for separating polyvinyl alcohol from a solution which comprises the steps of:

a. adding to an aqueous solution comprising 0.003 to 3 percent by weight of polyvinyl alcohol, about 0.1 to 50 parts by weight per part by weight of polyvinyl alcohol of a coagulating agent consisting essentially of:

1. a water-soluble sodium, lithium or potassium salt of boric acid and

2. a salting agent which is a member selected from the group consisting of ammonium, lithium, sodium, potassium, copper, magnesium, calcium, zinc, barium and aluminum salts of nitric, sulfuric, sulfurous, carbonic, phosphoric, thiosulfuric and hydrohalogenic acids, the amount of (2) in the coagulating agent being from about 0.01 to 50 parts by weight per part by weight of (1);

b. agitating the resulting mixture to coagulate the polyvinyl alcohol and

c. separating the coagulated polyvinyl alcohol from the mixture.

4,078,130

POLYVINYL HALIDE-BIS(HYDROCARBYL) VINYLPHOSPHONATE COPOLYMERS CROSSLINKED WITH AMINES

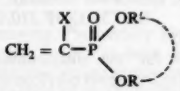
Jagadish C. Goswami, New City, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 582,463, May 30, 1975, abandoned.
This application Sep. 17, 1976, Ser. No. 724,122
Int. Cl.[2] C08F *14/02*; C09C *19/22*; C08F *30/02*
U.S. Cl. 526—17 15 Claims

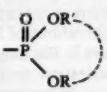
1. A crosslinked copolymer which consists essentially of:

(1) a vinyl halide; and

(2) a bis(hydrocarbyl)vinylphosphonate having the structure



wherein X is selected from the group consisting of hydrogen, halogen, cyano, aryl, haloaryl, C_1–C_{18} alkyl, C_1–C_{18} haloalkyl and



wherein R and R′ are hydrocarbyl and substituted hydrocarbyl groups consisting essentially of hydrogen and carbon and containing up to about 18 carbon atoms, inclusive, with the proviso that R and R′ may be the same, different or conjoint, said crosslinked copolymer being formed in the absence of a polyethylenically unsaturated crosslinking monomer by heating a copolymer of the vinyl halide and the vinylphosphonate in the presence of an amine crosslinking agent only.

4,078,131

EPT ELASTOMERS

Yves de Zarauz, Le Cendre, France, assignor to Compagnie Generale des Etablissements Michelin, France

Filed Aug. 6, 1976, Ser. No. 712,338
Claims priority, application France, Sep. 2, 1975, 75 27073
Int. Cl.[2] C08C *19/20*; C08F *210/18*
U.S. Cl. 526—20 7 Claims

1. Elastomers of the ethylene-propylene-termonomer type consisting essentially of

(a) a first principal fraction of low molecular weight comprising from about 30% to about 85% by weight (referred to the total weight of elastomers) of molecular fractions having:

an intrinsic viscosity distribution extending from about 0.2 to about 3,

an average intrinsic viscosity between about 0.8 and about 1.5,

an average propylene content of between about 36% and about 52% by weight, and

a termonomer content of between about 0% and about 5% by weight;

(b) a second principal fraction of high molecular weight comprising from about 70% to about 15% by weight (referred to the total weight of elastomers) of molecular fractions having:

an intrinsic viscosity distribution extending from about 3 to about 15,

an average intrinsic viscosity between about 3.5 and about 7,

an average propylene content of between about 26% and about 32% by weight, and

a termonomer content of between about 0% and about 5% by weight; and

(c) less than about 5% by weight (referred to the total weight of elastomers) of molecular fractions having a propylene content of less than about 25% by weight and a crystallization temperature of more than 35° C.;

said termonomer being a linear nonconjugated diene; said elastomers having a wide bimodal distribution of the molecular weights; and each of the two said principal fractions having

a wide distribution of the molecular weights,

a propylene and ethylene content which is different from that of the other principal fraction, and

a distribution of propylene and ethylene which is very narrow (± 2%) around the average value contemplated for the fraction.

4,078,132

"PROCESS FOR PREPARING PETROLEUM RESINS HAVING LOW SOFTENING POINTS AND NARROW MOLECULAR WEIGHT RANGES"

Andre Lepert, des Mouettes 2/B/1640 Rhode-Saint-Genese, Belgium

Filed Aug. 9, 1976, Ser. No. 712,537
Claims priority, application United Kingdom, Aug. 13, 1975, 33705/75
Int. Cl.[2] C08F *2/00, 4/00, 4/42, 240/00*
U.S. Cl. 526—76 15 Claims

1. A process for preparing a low softening point resin useful as a tackifying agent for natural and synthetic rubbers which comprises polymerising using a Friedel Crafts catalyst

(1) a petroleum resin feed comprising C_5 olefins and C_5 diolefins or a mixture of C_5 and C_6 olefins and diolefins, said feed being obtained from the cracking of petroleum feedstock and being subjected to thermal soaking at a temperature of 100° C. to 150° C., and adding to said feed

(2) a branched chain aliphatic monoolefin transfer agent, in an amount of 10–400 wt. %, or a phenol or ether transfer agent, in an amount of 0.1 to 5 wt. %, based on the weight of petroleum resin feed, to obtain a resin of narrowed molecular weight distribution.

4,078,133

PROCESS FOR PRODUCING WATER-SOLUBLE VINYL HIGH-POLYMERS BY REVERSED-PHASE EMULSION POLYMERIZATION

Kazutaka Ozima, 1573-133 Tottori, Hannan-cho, Sennan, Osaka, Japan

Filed Nov. 26, 1976, Ser. No. 744,954

Claims priority, application Japan, Dec. 1, 1975, 50-143725; Dec. 1, 1975, 50-143726; Jun. 17, 1976, 51-72059

Int. Cl.[2] C08F *2/00, 20/70*

U.S. Cl. 526—80 **9 Claims**

1. A process for producing powdery, water-soluble, vinyl polymers having a high degree of polymerization, by W/O emulsion polymerization, which comprises the steps of: in a reaction vessel having a reflux condenser at its top, forming a reaction mixture consisting essentially of (1) an oil phase consisting essentially of a mixture of at least two non-polar organic solvents which are soluble with each other, and substantially immiscible with water and which have different boiling points, said solvent mixture having a boiling temperature in the range of from 30° to 60° C, said boiling temperature being in the temperature range for effecting polymerization of water-soluble vinyl monomers, (2) a W/O emulsifier and (3) a water phase consisting essentially of an aqueous solution of a water-soluble vinyl monomer or mixture of said monomers, said emulsifier being effective to emulsify said water phase in said oil phase, the amount of said water phase being less than twice the amount of said emulsifier whereby said water phase is solubilized by said emulsifier and is dispersed in said oil phase to form a W/O emulsion;

heating said W/O emulsion reaction mixture to the boiling temperature of said solvent mixture, and simultaneously agitating said reaction mixture, and maintaining said reaction mixture at said boiling temperature under stable reflux conditions to start polymerization of said monomer to form vinyl polymer in the dispersed water phase of said reaction mixture; and

then intermittently or continuously adding to said reaction mixture, while it is maintained under said reflux and agitation and in said W/O emulsion state, additional quantities of said aqueous solution of water-soluble vinyl monomer whereby to effect polymerization of said monomer, said additional quantities being added at such a rate that the concentration of the vinyl polymer present in the dispersed water phase of said W/O emulsion reaction mixture is continuously maintained at not less than 20 percent by weight, based on the weight of the water phase of said reaction mixture, during said adding step and until completion of the polymerization period.

4,078,134

PROCESS FOR THE MANUFACTURE OF SUSPENSION POLYMERS OF TETRAFLUOROETHYLENE

Jürgen Kuhls, Burghausen (Salzach); Alfred Steininger, and Herbert Fitz, both of Burgkirchen (Alz), all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed May 20, 1976, Ser. No. 688,234

Claims priority, application Germany, May 28, 1975, 2523569

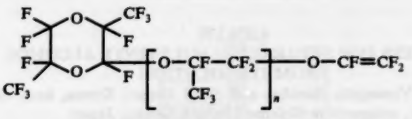
Int. Cl.[2] C08F *114/26*

U.S. Cl. 526—204 **5 Claims**

1. In the process for polymerizing tetrafluoroethylene by the suspension process in the presence of a catalyst and optionally buffer substances, pecipitating agents, small amounts of emulsifiers and heavy metal salts, the improvement which comprises conducting the suspension polymerization in the presence of from 0.0004 to 0.0029 mol %, calculated on the tetrafluoroethylene used, of a perfluorinated ether having the formula:

$$CF_2=CF-O-R_f \qquad (I)$$

in which R_f represents a perfluoroalkyl radical having from 1 to 10 carbon atoms or a perfluorinated ether having the formula:



(II)

in which n is zero to 4,

or a mixture of perfluorinated ethers according to formulas (I) and (II).

4,078,135

PROCESS FOR THE MANUFACTURE OF SUSPENSION POLYMERS OF TETRAFLUOROETHYLENE

Reinhard Sulzbach; Jürgen Kuhls, both of Burghausen, Salzach, and Herbert Fitz, Burgkirchen, Alz, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

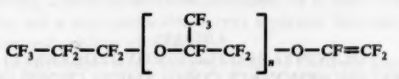
Filed May 20, 1976, Ser. No. 688,239

Claims priority, application Germany, Apr. 23, 1976, 2617829

Int. Cl.[2] C08F *14/26, 114/26*

U.S. Cl. 526—209 **4 Claims**

1. In the process of polymerizing tetrafluoroethylene by the suspension process in the presence of a usual catalyst and optionally buffer substances, precipitating agents, small amounts of emusifiers and heavy metal salts, the improvement which comprises conducting the suspension polymerization in the presence of from 0.0004 to 0.0029 mol %, calculated on the tetrafluoroethylene used, of at least one perfluorinated ether having the formula:



in which n is 1 to 4.

4,078,136

PROCESS FOR THE PRODUCTION OF A COPOLYMER FROM A GASEOUS MONOMER AND A LIQUID MONOMER

Peter Pietschmann, and Peter Ludwig, both of Burghausen, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed Sep. 1, 1976, Ser. No. 719,352

Claims priority, application Germany, Sep. 30, 1975, 2543657

Int. Cl.[2] C08F *210/02*

U.S. Cl. 526—331 **5 Claims**

1. A process for the discontinuous production of a copolymerizate from gaseous ethylene and a liquid ethylenically-unsaturated monomer comprising the steps of mixing at least one ethylenically-unsaturated monomer which is liquid under the polymerization conditions with a liquid polymerization medium in a first confined space, polymerizing said monomer with from 5% to 50% by weight of the total monomers of ethylene which is gaseous under the polymerization conditions at polymerization temperatures of from 20° C to 85° C under constant excess pressure in the range of from 10 bar to 50 bar in said liquid polymerization medium in the presence of a free-radical polymerization catalyst, supplying a second confined gas space above said liquid polymerization medium, said second confined gas space being in pressure sealable communication with said first confined space and of a volume as large as the customary gas space under the polymerization conditions above the liquid level in a conventional first confined space polymerization area, continuing said polymerization until termination while continuously supplying said gaseous ethylene under said constant excess pressure, pressure sealing said second confined gas space, terminating said polymerization by

relieving said excess pressure in said first confined space while maintaining said constant excess pressure in said pressure sealed second confined gas space.

4,078,137

PROCESS FOR MANUFACTURING A FLAVONE DERIVATIVE

Christian Schmid, Adliswil; Max Glasbrenner, Zurich, and Jean Heusser, Langnau, all of Switzerland, assignors to Hommel Aktiengesellschaft, Adliswil, Switzerland

Filed May 6, 1976, Ser. No. 683,790

Claims priority, application Switzerland, May 16, 1975, 6335/75

Int. Cl.[2] C07H *15/00*

U.S. Cl. 536—8 8 Claims

1. In a method for manufacturing therapeutically pure diosmin having a bromine content of less than 0.1% by weight bromine which includes the steps of acetylating hesperidin, brominating the acetylated hesperidin, hydrolyzing the bromination product, precipitating the hydrolyzed product and isolating the precipitated product to obtain said diosmin, the improvement comprising:

carrying out and controlling the acetylation step in the presence of an effective acetylation catalyst until such time as the ultraviolet absorption band which initially appears at 264 to 280 nm disappears and a new maximum ultraviolet absorption band at about 330 nm appears.

4,078,138

3'-EPI-4'DEOXYKANAMYCIN B

Eiichi Akita, Kamakura; Yukio Horiuchi, Yokohama; Takeo Miyazawa, Yokohama; Toshio Yoneta, Yokohama; Sumio Umezawa, and Hamao Umezawa, both of Tokyo, all of Japan, assignors to Meiji Seika Kaisha, Ltd., Tokyo, Japan

Filed Dec. 5, 1975, Ser. No. 638,045

Claims priority, application Japan, Dec. 11, 1974, 49-141498

Int. Cl.[2] C07H *15/22*

U.S. Cl. 536—10 1 Claim

1. 3'-epi-4'-deoxykanamycin B.

4,078,139

PROCESS FOR DEOXYGENATING SECONDARY ALCOHOLS

Derek H. R. Barton, London, England, and Stuart W. McCombie, West Orange, N.J., assignors to Schering Corporation, Kenilworth, N.J.

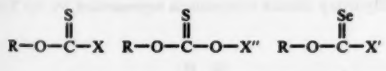
Continuation-in-part of Ser. No. 600,704, Jul. 31, 1975, abandoned. This application Jul. 12, 1976, Ser. No. 704,703

Int. Cl.[2] C07H *15/22;* C07J *31/00*

U.S. Cl. 536—17 10 Claims

1. The process for removing a secondary hydroxyl group from an organic compound having at least one secondary hydroxyl group and having any amino groups protected,

which comprises the reaction of an O-alkylthio ester or an O-alkylseleno ester of said secondary alcohol with at least a molar equivalent of an organotin hydride in an inert, aprotic solvent at a temperature of at least about 100° C and under an inert atmosphere; said O-alkylthio ester being a compound of formula A or B, and said O-alkylseleno ester being a compound of formula C:



A B C

wherein R is the radical of an organic compound bonded to the oxygen by a methine carbon; X is hydrogen or an aliphatic, alicyclic or aromatic radical which may contain hetero atoms and which is bonded to the thiocarbonyl group through a carbon, nitrogen or sulfur atom; X'' is either an aliphatic, alicyclic or aromatic radical which may contain hetero atoms, or is a chemical bond to a carbon atom of the radical R, said carbon atom being in a position α or β relative to the said methine carbon; and X' is an aromatic radical;

with the proviso that when said O-alkylthio ester is a compound of formula B, said reaction is carried out in the presence of a radical initiator which decomposes at about 100° C;

whereby said O-alkylthio ester group or said O-alkylseleno ester group is replaced by hydrogen to form a deoxy derivative of said organic compound.

6. The process of claim 1 wherein said organic compound having at least one secondary hydroxyl group is a 4-O-aminoglycosyl-6-O-garosaminyl-2-deoxystreptamine having amino functions protected by a member selected from the group consisting of benzyloxycarbonyl, alkoxy benzyloxycarbonyl, alkoxycarbonyl and alkanoyl;

wherein said O-alkylthio ester is an O-sec.-alkyl thiobenzoate of formula A; and

wherein said organotin hydride is tri-n-butylstannane.

4,078,140

2,3-DI-(2,3-DIIODOPROPOXY)-PROPYL CELLULOSE AND METHOD OF PRODUCING THE SAME

Alain Roman, Bossey; Jean-Pierre Sachetto, St. Julien-en-Genevois, both of France; Manfred Wust, Dardagny, and Sergio Cuccolo, Geneva, both of Switzerland, assignors to Neste Oy, Finland

Filed Jun. 23, 1977, Ser. No. 809,451

Int. Cl.[2] C08B *11/00;* G03C *1/52*

U.S. Cl. 536—84 9 Claims

1. 2,3-di-(2,3-diiodopropoxy)-propyl cellulose.

2. Method of producing the 2,3-di-(2,3-diiodopropoxy)-propyl cellulose of claim 1, which comprises reacting a dihalogenopropyl ether of cellulose with an alkali metal allylate to form 2,3-di-allyloxy-propyl cellulose, and subjecting said 2,3-di-allyloxy-propyl cellulose to iodine addition reaction on the allyl groups thereof.

4,078,141

5-(2-NITROPHENYL)-2-FURANCARBOXIMIDOYL MORPHOLINE OR PYRROLIDINE HYDROCHLORIDE

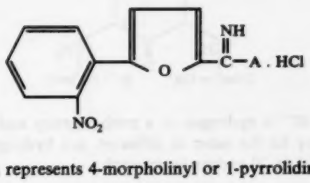
Stanford S. Pelosi, Jr.; Ronald E. White; George C. Wright, and Chia Nien Yu, all of Norwich, N.Y., assignors to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Jan. 25, 1977, Ser. No. 765,622

Int. Cl.[2] C07D *405/02, 413/02*

U.S. Cl. 544—152 3 Claims

1. A compound of the formula:



wherein A represents 4-morpholinyl or 1-pyrrolidinyl.

4,078,142

AMINO SUBSTITUTED-4-T-BUTYLPHTHALIC ACID ESTERS

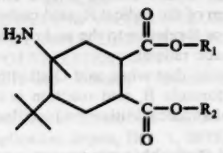
Robert G. Keske, Naperville, Ill., assignor to Standard Oil Company, Chicago, Ill.

Filed Jun. 28, 1976, Ser. No. 700,583

Int. Cl.[2] C07C *101/66*

U.S. Cl. 560—19 3 Claims

1. As a composition of matter, an amino-substituted ester of 4-t-butylphthalic anhydride, said ester having the general formula



wherein R_1 and R_2 are individually selected from the group consisting of alkyl radicals and aryl radicals.

4,078,143

PROCESS FOR DEPOLYMERIZING WASTE ETHYLENE TEREPHTHALATE POLYESTER

Abdul-Ilah Malik, and Elmer Edwin Most, both of Kinston, N.C., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 9, 1976, Ser. No. 647,995
Int. Cl.[2] C07C *69/82, 67/48, 67/00*
U.S. Cl. 560—78 **1 Claim**

1. In the process of depolymerizing waste ethylene terephthalate polyester of form bis-(2-hydroxyethyl)terephthalate and low molecular weight polymers thereof by glycolysis of the polyester waste with excess ethylene glycol at elevated temperatures; the improvement for inhibiting formation of glycol ethers which comprises preparing a reaction mixture of 1 part of the waste polyester in 0.88 to 3.6 parts bis-(2-hydroxyethyl)terephthalate, 0.1 to 0.5 part ethylene glycol and 0.000200 to 0.000500 part sodium acetate trihydrate, and heating the reaction mixture to depolymerize the polyester while continuously introducing 0.005 to 0.35 part per hour of water into the reaction mixture to inhibit formation of diethylene glycol.

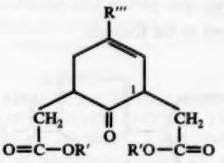
4,078,144

LACTONES AND ESTER DERIVATIVES THEREOF

Joe B. Lavigne, Oakland, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 549,612, Feb. 13, 1975. This application Jan. 11, 1977, Ser. No. 758,515
Int. Cl.[2] C07C *69/74, 61/38*
U.S. Cl. 560—126 **1 Claim**

1. Cyclic keto esters or acids of spirodilactones of propenyl or isobutenyl bis(succinic anhydride) having the formula:



in which R''' is hydrogen or a methyl group and R' groups, which may be the same or different, are hydrogen or alkyl groups of 1 to 20 carbon atoms each.

4,078,145

PHYTOQUINOID POSSESSING ANTI-TUMOR ACTIVITY

Norman R. Farnsworth; Geoffrey A. Cordell, and Masaru Ogura, all of Chicago, Ill., assignors to University of Illinois Foundation, Urbana, Ill.

Filed May 24, 1976, Ser. No. 689,096
Int. Cl.[2] C07C *69/74*
U.S. Cl. 560—126 **5 Claims**

1. The lower aliphatic alcohol extract from the plant *Jacaranda caucana* Pittier containing jacaranone in amounts sufficient to show invivo anti-tumor activity in the lymphocytic leukemia P 388 system.

2. A method of preparing the extract of claim 1 comprising the steps of extracting the twig-leaf or stem bark parts of *Jacaranda caucana* Pittier with a lower aliphatic alcohol followed by removing a portion or all of the alcohol.

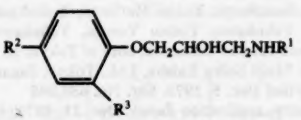
4,078,146

PHENOXY PROPANOLAMINES

Peder Bernhard Berntsson, Vastra Frolunda; Arne Elof Brändström, Goteborg N; Enar Ingemar Carlsson, Kungsbacka; Stig Ake Ingemar Carlsson, Molnlycke; Lars Ek, Kungsbacka; Benny Roger Samuelsson, Pixbo; Sven Erik Sjostrand, Kungsbacka; Gert Christer Strandlund, Molndal, and Bengt Arne Hjalmar Ablad, Goteborg C, all of Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden

Division of Ser. No. 618,754, Oct. 2, 1975, Pat. No. 4,035,420, which is a continuation-in-part of Ser. No. 376,947, Jul. 6, 1973, Pat. No. 3,930,016. This application Nov. 24, 1976, Ser. No. 744,858
Claims priority, application Sweden, Jul. 6, 1972, 8927/72
Int. Cl.[2] C07C *125/06*
U.S. Cl. 560—160 **18 Claims**

1. An amine of the formula I



(I)

wherein R^1 is lower alkyl or hydroxy lower alkyl; R^2 is carbamoyloxy lower alkyl, mono lower alkyl carbamoyloxy lower alkyl, di-lower alkyl carbamoyloxy lower alkyl, carbamoyloxy lower alkoxy, mono lower alkyl carbamoyloxy lower alkoxy or di-lower alkyl carbamoyloxy lower alkoxy; and R^3 is hydrogen, halogen, lower alkyl, lower alkenyl, lower alkinyl, lower alkoxymethyl, lower alkoxy, lower alkenyloxy, lower alkinyloxy, lower alkylthio, lower alkenylthio, lower alkinylthio or lower alkanoyl; or an addition salt of said compound I with a pharmaceutically acceptable non-toxic acid.

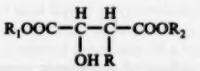
4,078,147

HYDROXY ACID ESTERS OF HIGHER ALCOHOLS

Akitoshi Ukai, and Yutaka Usui, both of Yokohama, Japan, assignors to The Nisshin Oil Mills, Ltd., Tokyo, Japan

Filed Sep. 10, 1975, Ser. No. 612,143
Int. Cl.[2] C07C *69/66*
U.S. Cl. 560—180 **20 Claims**

1. Hydroxy diester compounds represented by the Formula I,



I

wherein R is hydrogen or hydroxyl, and R_1 and R_2 which may be the same or different are selected from the group consisting of 2-hexyldecyl, 2-octyldodecyl, 2-heptylundecyl or 5,7,7-trimethyl-2-(1,3,3-trimethylbutyl)-octyl.

4,078,148

POLYETHER ESTERS

Norbert Vollkommer, Troisdorf; Hermann Richtzenhain, Schwellenbach Post Marialinden; Gerhard Bier, and Manfred Gorlitz, both of Troisdorf, all of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Cologne, Germany

Filed Oct. 10, 1973, Ser. No. 405,235

Claims priority, application Germany, Oct. 13, 1972, 2250223

Int. Cl.[2] C07C 69/66

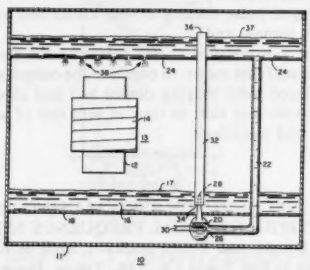
U.S. Cl. 560—185 18 Claims

1. Process for the preparation of a polymer which is the addition polymerization product of tetrahydrofuran and γ-butyrolacetone (I), or hexamethyleneoxide and Γ-butyrolactone (II), comprising contacting tetrahydrofuran and γ-butyrolactone for (I), or hexamethyleneoxide and γ-butyrolactone (II), in the presence of an initiator, said initiator being a fluoride or chloride of antimony or a chloride of tin or titanium, in an amount sufficient to initiate the addition polymerization, and conducting said contacting at a temperature and for a time sufficient for the addition polymerization.

4,078,149
VAPOR LIFT PUMP FOR VAPOR-COOLED TRANSFORMERS

Donald K. Whirlow, Murrysville, Pa.; John G. Aldworth, and Garlington C. Wilburn, both of South Boston, Va., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Oct. 12, 1976, Ser. No. 731,392
Int. Cl.[2] H01F *27/18*
U.S. Cl. 174—15 R 7 Claims



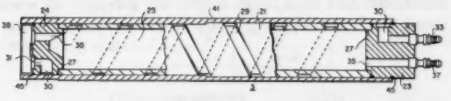
1. Electrical inductive apparatus comprising:
a casing;
a heat-producing member disposed within said casing;
means defining a first reservoir within said casing disposed below said heat-producing member;
means defining a second reservoir within said casing disposed above said heat-producing member;
a dielectric fluid vaporizable within the normal operating temperature range of said heat-producing member disposed in said first and second reservoir means;
means defining a chamber having inlet and outlet openings;
first connecting means having first and second openings disposed in fluid flow communication between said inlet opening of said chamber and said second reservoir means, respectively, to provide dielectric fluid to said chamber;
means for vaporizing a portion of said dielectric fluid contained in said chamber; and
second connecting means having first and second openings disposed in fluid flow communication between said first and second reservoir means, respectively;
said chamber being disposed with its said outlet opening below the level of said dielectric fluid in said first reservoir means, said outlet opening further being disposed within and surrounded by said first opening of said second connecting means to allow said vaporized dielectric fluid to flow from said outlet opening into said second connecting means wherein the high velocity of said vaporized dielectric fluid flowing therethrough lifts a portion of said dielectric fluid in said first reservoir means through said first opening of said second connecting means and into said second connecting means and thence into said second reservoir means;
said second reservoir means including means for applying said dielectric fluid to said heat-producing member to effect cooling thereof.

4,078,150
LIQUID-COOLED STUD FOR TERMINAL BUSHINGS OF A GENERATOR

Roger H. Daugherty, Wilkinsburg, and Roger L. Swensrud, Plum Borough, both of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Aug. 4, 1976, Ser. No. 711,335
Int. Cl.[2] H01B *17/54, 17/26*
U.S. Cl. 174—15 BH 3 Claims

2. A terminal bushing stud for an electrical apparatus, said stud comprising an inner tubular member having end caps fastened thereto to form a compartment therein, an outer tubular member tightly embracing the inner tubular member to form contiguous surfaces therebetween, a spiral groove disposed in one of the contiguous surfaces so as to terminate adjacent opposite ends of the contiguous surfaces, inlet means disposed in fluid communication with the spiral groove, outlet means disposed in fluid communication with the compartment within the inner tubular member, and means for providing fluid

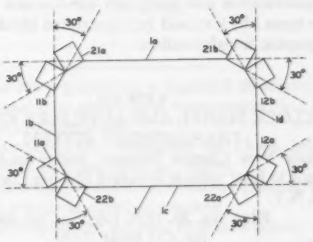


communication between the spiral groove and the compartment within the inner tubular member, the inlet and outlet means being disposed in one of the end caps and the means for providing communication between the groove and the compartment within the inner tubular member being disposed in the other end cap, whereby a cooling fluid may be circulated through the stud to remove heat therefrom.

4,078,151
ELECTRONIC GRAPHICS PAD

James J. McNeary, Sun Prairie, Wis., assignor to Wisconsin Alumni Research Foundation, Madison, Wis.

Filed Oct. 18, 1976, Ser. No. 733,428
Int. Cl.[2] G08C *9/06, 21/00*
U.S. Cl. 178—18 9 Claims



1. A device for the conversion of the position of a source of light on a planar surface into electrical signals representative of the position of said source on said surface comprising:
(a) a flat substantially transparent panel having opposite flat surfaces and at least one side connecting said flat surfaces and defining the periphery of said panel, one of said flat surfaces being rendered opaque,
(b) a plurality of photoconductors arrayed about the periphery of said panel and mounted in position to receive light transmitted through said peripheral side of said panel, and
(c) means for creating a pair of voltages responsive to the changes of resistance of said photoconductors, said voltages cooperating to indicate the position of a source of light on the panel in two orthogonal directions.

4,078,152
BLOCK-CIPHER CRYPTOGRAPHIC SYSTEM WITH CHAINING

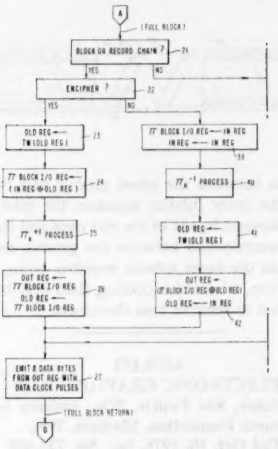
Louis Bryant Tuckerman, III, Briarcliff Manor, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Apr. 26, 1976, Ser. No. 680,405
Int. Cl.[2] H04K *1/06;* H04L *9/02*
U.S. Cl. 178—22 16 Claims

1. In a cryptographic system which includes a key-controlled block-cipher cryptographic process which comprises

taking an input data block of fixed size, called a full-block and cryptographically transforming same into an output data block of the same fixed size as a function of a unique user supplied key, the improvement which comprises

combining each new block of input data and initially transforming same by a mathematically invertible function which depends on a data word which existed during a previous key-controlled block-cipher cryptographic transformation and using said transformed data block as the input block to said key-controlled block-cipher cryptographic transformation.



1. A transmission system for transmitting clock signals and auxiliary signals from a sending circuit to at least one receiving circuit comprising:

said sending circuit including

first means to produce periodic two-level clock signals each having a first transition in one direction and a second transition in a direction opposite said one direction; and

second means coupled to said first means to shift in time one of said first and second transitions as a function of said auxiliary signals; and

said receiving circuit including

third means coupled to said second means to detect said shift in time of said one of said first and second transitions and to produce said auxiliary signals as a first output signal of said receiving circuit; and

fourth means coupled to said second means to generate said clock signals from the other of said first and second transitions and to provide said clock signals as a second output signal of said receiving circuit;

said fourth means including

a pulse shaping circuit;

said third means including

a retriggering monostable multivibrator; and said second means including

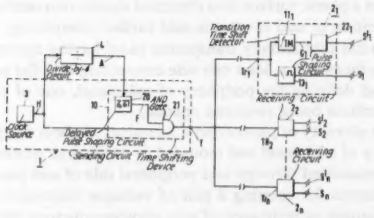
a delayed pulse shaping device controlled by said auxiliary signals, and

a logic gate coupled to said delayed pulse shaping device and said first means to combine the output signal of said delayed pulse shaping device and said clock signals to provide said shift in time of said one of said first and second transitions.

4,078,153
CLOCK SIGNAL AND AUXILIARY SIGNAL TRANSMISSION SYSTEM

Jean-Louis Yves Charles Moreau, Juvisy-sur-Orge, France, assignor to International Standard Electric Corporation, New York, N.Y.

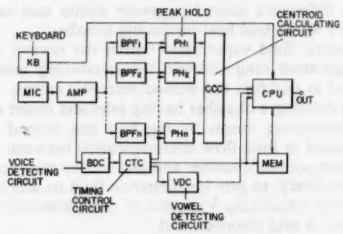
Filed Sep. 30, 1976, Ser. No. 728,494
Int. Cl.² H04L *7/00*
U.S. Cl. 178—69.1 **8 Claims**



4,078,154
VOICE RECOGNITION SYSTEM USING LOCUS OF CENTROID OF VOCAL FREQUENCY SPECTRA

Matsumi Suzuki, and Yoichi Ichikawa, both of Ebina, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Aug. 9, 1976, Ser. No. 712,993
Claims priority, application Japan, Aug. 9, 1975, 50-97032
Int. Cl.² G10L *1/00*
U.S. Cl. 179—1 SB **4 Claims**



1. A voice recognition system comprising first means for periodically detecting the average frequency and average amplitude of at least a first voice signal to obtain a locus of the centroid of frequency spectra of said first voice, means for storing said locus, means for calculating a humming distance between a selected stored locus of the centroid of frequency spectra and a locus of the centroid of frequency spectra of a second voice detected by said first means, means for comparing said humming distance to a preselected value, a humming distance below said preselected value being accepted as an indication that both loci were detected from voice signals from a single person.

4,078,155
TELEPHONE APPARATUS FOR USE IN A CONFERENCE ROOM

Radamis Botros, Ottawa, and Conrad Damien Lafrance, Lucerne, both of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jan. 17, 1977, Ser. No. 760,078
Int. Cl.² H04M *1/20*
U.S. Cl. 179—1 CN **7 Claims**

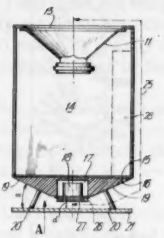
1. A telephone apparatus for use in a conference room, comprising:

a housing having a vertical central axis;

a speaker mounted at a top end of said housing, the axis of the speaker coaxial with said vertical axis, said speaker facing upwards and having an unrestricted outlet to provide an omnidirectional output;

a microphone housing in the bottom end of said housing,

said microphone housing having an aperture in a bottom surface facing downwards and coaxial with said vertical axis, a circular microphone in said aperture in the microphone housing, the microphone coaxial with said vertical axis, being sensitive to airborne vibration only and insensitive to mechanical vibration, and an inclined surface extending outwardly and upwardly from the periphery of said aperture to the housing, the inclined surface at an



angle of about 30° ± 5° relative to a plane normal to said vertical axis, to provide an omnidirectional sensitivity of the microphone; and

means for supporting said housing with a front surface of the microphone a distance of about ½ inch ± 0.05 inch from a surface normal to said vertical axis;

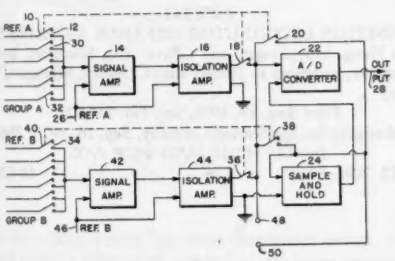
the minimal peripheral distance from the centre line of said speaker to the centre line of said microphone, around the outside of said housing, being of the order of 15 inches.

4,078,156

DRIFT CANCELLATION CIRCUIT FOR MULTIPLEXER AMPLIFIER

Marion J. Langan, Huntsville, Ala., assignor to Avco Corporation, Huntsville, Ala.

Filed Jan. 3, 1977, Ser. No. 756,315
Int. Cl.² H04J 3/04
U.S. Cl. 179—15 BL **9 Claims**



1. A multiplexed data monitoring system for converting the input signal on each channel of a plurality of parallel data channels into a sequence of measured data output samples, the combination comprising:

a reference signal having a magnitude approximately equal to the mean of said input signals;

a differential signal amplifier section, said differential amplifier section having first and second input terminals, and an output terminal;

means during a first period for applying said reference signal simultaneously to said first and second input terminals of said differential amplifier section;

a sample and hold circuit;

means for applying the output of the differential amplifier section to said sample and hold circuit during said first period;

a signal measuring unit having first and second input terminals isolated with respect to ground;

means applying the output of said sample and hold circuit to one of said terminals;

means for subsequently sequentially applying said input signals to said first input terminal of said differential amplifier section; and

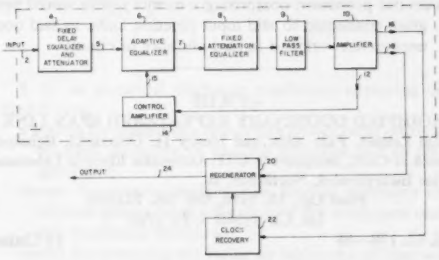
means for applying the output signal from said differential amplifier section to the other input terminal of said signal measuring unit.

4,078,157

METHOD AND APPARATUS FOR REGENERATING A MODIFIED DUOBINARY SIGNAL

Adam Lender, Palo Alto, and Henry H. Olszanski, Belmont, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 18, 1976, Ser. No. 733,597
Int. Cl.² H04B 3/36
U.S. Cl. 179—16 EA **7 Claims**



1. Apparatus for regenerating a modified duobinary signal from such a signal degraded during transmission over a transmission path which comprises:

means for automatically equalizing for phase delay and attenuation of said degraded line signal;

means for selecting the equalized modified duobinary signal from said automatic equalizing means;

means for amplifying the selected equalized signal;

means for generating a timing signal from said amplified line signal; and

means connected to said generating means and said amplifying means for retiming and reshaping said amplified equalized signal to obtain a regenerated modified duobinary signal.

4,078,158

CALL DISTRIBUTING AUTOMATIC TELEPHONE INSTALLATION

Yvon Houée, Brest, and Claudine Santier, Vertou, both of France, assignors to Societe Francaise des Telephones Ericsson, Colombes, France

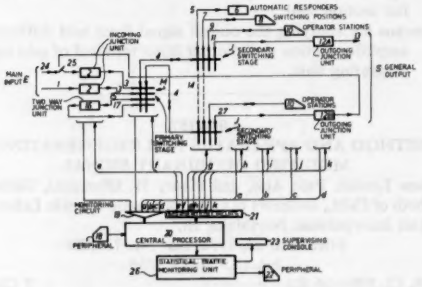
Continuation-in-part of Ser. No. 530,005, Dec. 5, 1974, abandoned, which is a continuation-in-part of Ser. No. 322,619, Jan. 11, 1973, abandoned. This application Sep. 10, 1976, Ser. No. 722,288
Claims priority, application France, Jan. 13, 1972, 72.01151
Int. Cl.² H04Q 3/66
U.S. Cl. 179—27 D **6 Claims**

1. An automatic telephone installation applicable to chronological call distributions, including:

a plurality of identical inputs connected through junction units for call and enquiry to the input of a single connection network capable of making a plurality of connections at one time;

a plurality of circuits of various elements, said various elements including recorders, switching position stations, operator stations and outgoing junction units, the inputs of

which are respectively connected to the outputs of said connection network, the outputs from said various elements forming identical interface units between said connection network and output terminals of said installation;



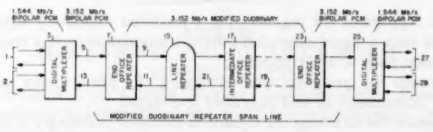
a central processor, comprising a memory with stored program connected to said input junction units, to said connection network and to said plurality of circuits.

4,078,159

MODIFIED DUOBINARY REPEATERED SPAN LINE

Adam Lender, Palo Alto, and Henry H. Olszanski, Belmont, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 18, 1976, Ser. No. 733,596
Int. Cl.² H04B *3/36, 3/04*
U.S. Cl. 178—68 **16 Claims**



1. A modified duobinary repeatered transmission system which comprises:

means for changing a high-speed bipolar bit stream into a modified duobinary bit stream for transmission comprising:

means for converting said high-speed bipolar bit stream into a unipolar bit stream;

means for scrambling said unipolar bit stream;

and means for encoding said scrambled unipolar bit stream to obtain a modified duobinary bit stream; and

means for recovering said high-speed bipolar bit stream from said transmitted modified duobinary bit stream at a receiving location comprising:

means for equalizing the incoming modified duobinary bit stream;

means for generating a clock signal from the incoming bit stream;

means responsive to the output of said equalizing means and to said clock signal for regenerating said modified duobinary bit stream;

means responsive to said regenerated bit stream and said clock signal to decode said bit stream and obtain a unipolar bit stream;

means for descrambling said unipolar bit stream, said descrambling means having an input connected to receive said decoded unipolar bit stream and an input connected to receive said clock signal; and

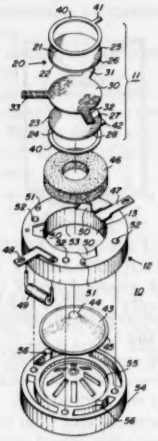
means for converting said unipolar bit stream into a bipolar bit stream.

4,078,160

PIEZOELECTRIC BIMORPH OR MONOMORPH BENDER STRUCTURE

Jonathan Robert Bost, Palatine, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Jul. 5, 1977, Ser. No. 812,537
Int. Cl.² H04R *17/00;* H01L *41/04, 41/10, 41/22*
U.S. Cl. 179—110 A **18 Claims**



7. An improved bender having a first piezoelectric disc with a pair of flat axially opposing faces, each face having electrodes deposited thereon, said bender having a second disc with substantially the same dimensions as the first disc, the improvement comprising:

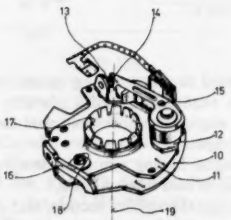
a conductively coated mesh of a predetermined thickness of stiff non-metallic filaments and positioned between the first and the second discs to provide contact therewith and to permit relative motion therebetween.

4,078,161

IGNITION DISTRIBUTOR BREAKER ASSEMBLY

Heinz Haug, Munchingen, and Günter Kas, Stuttgart, both of Germany, assignors to Robert Bosch GmbH, Stuttgart, Germany

Filed Aug. 19, 1976, Ser. No. 716,022
Claims priority, application Germany, Sep. 16, 1975, 2541164
Int. Cl.² H01H *19/00;* F02P *7/00*
U.S. Cl. 200—19 R **13 Claims**



1. Internal combustion engine ignition breaker assembly construction comprising

a fixed carrier plate (10) and a breaker contact support plate (11) located axially adjacent the carrier plate (10) and pivotable with respect thereto about the central axis (19) of the assembly,

a bearing sleeve (17) of elastic material fitted coaxially with

said axis into central openings formed in both the carrier plate (10) and the support plate (11) and connecting said plates, said sleeve being inserted through the openings of said plates and including means to hold said plates together and forming a bearing for said support plate (11) and permitting rotation with respect to said carrier plate (10),

said bearing sleeve (17) being formed with a first radial projection forming a flange (27) engaging the exposed surface of one of said plates and being further formed with a second axially extending projection including holding projections (30) extending radially therefrom and engaging over the exposed surface of the other of said plates (11),

the sleeve (17) being formed with axially extending slits beginning at the holding projections (30) and terminating short of the flange (27) whereby the sleeve (17) will be subdivided into projecting tongues (28) throughout the portion of its axial length;

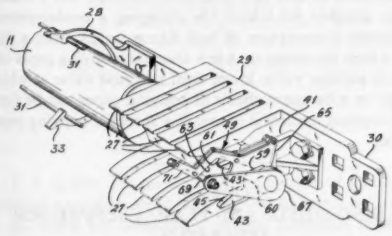
and a spring ring (33) located interiorly of said sleeve (17) in the region of said tongues (28) and exerting radially outwardly directed resilient force on said tongues to tend to press the tongues outwardly and hence the holding projections in overlapping engagement over the other of said plates (11).

4,078,162

BLADE LOCK FOR ELECTRIC SWITCH

John L. Turner, East St. Louis, Ill., assignor to Turner Electric Corporation, East St. Louis, Ill.

Filed Mar. 22, 1976, Ser. No. 669,221
Int. Cl.² H01H 31/00
U.S. Cl. 200—48 A **10 Claims**



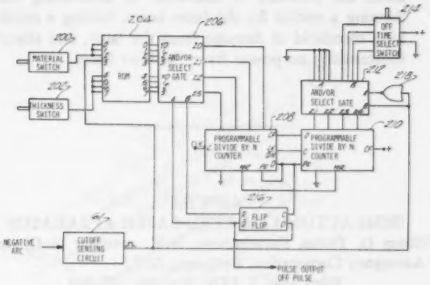
1. In a high voltage air break disconnect switch, an elongated blade, a terminal at each end of said blade, means mounting the blade at its one end to swing about one terminal toward and away from the other terminal, a contact on the other end of said blade, said blade being rotatable about its longitudinal axis to shift said contact into and out of engagement with the other terminal when the blade is adjacent the other terminal, and a latch member pivoted to said other terminal on an axis parallel to said blade and having a hook portion positionable in the path of swinging movement of said other end of the blade toward open position to block such movement when said blade is in fully closed position, said blade having a radial arm fixed to its other end abuttingly engageable with said latch member, said radial arm being rotatable when said blade rotates about its axis out of contact with said other terminal for moving said latch member and the hook portion thereof out of the path of said blade to permit said blade to swing away from said other terminal.

4,078,163

PROGRAMMABLE CURRENT CONTROL SYSTEM FOR WIRE ELECTRODE ELECTRICAL DISCHARGE MACHINING APPARATUS

Oliver A. Bell, Jr., 654 Heatherly Rd., Mooresville, N.C. 28115, and Randall C. Gilleland, Rt. No. 7, Box 418, Statesville, N.C. 28677

Filed Jun. 4, 1975, Ser. No. 583,794
Int. Cl.² B23P 1/08
U.S. Cl. 219—69 C **9 Claims**



1. In an electrical discharge machining apparatus of the digital type:

a system for controlling machining power pulse on-time and off-time, including an on-time generator and an off-time generator;

means for preprogramming the time of operation of the off-time generator as a function of the workpiece material and workpiece thickness;

means for presetting the factor by which the off-time will be increased during gap short circuit condition;

short circuit sensing means for providing a control signal representative of gap short circuit condition; and

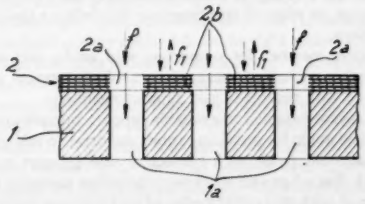
gating means for receiving said control signal and for providing the preprogrammed off-time duration during normal operation and for providing the increased off-time operation during gap short circuit condition.

4,078,164

PROCESS FOR THE ACCOMPLISHMENT OF DEEP MICROENGRAVING BY A LASER BEAM

Jacques Pelletier, Grenoble, and Francois Rinchet, St. Martin d'Heres, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Jan. 9, 1976, Ser. No. 647,764
Claims priority, application France, Jan. 9, 1975, 75 00567
Int. Cl.² B23K 9/00
U.S. Cl. 219—121 LM **4 Claims**



1. A process for deep micro-engraving of a material comprising the steps of:

superpositioning a plurality of elementary layers of respectively alternating indices of refraction on the material, each of the layers being individually transparent to a

predetermined wavelength in vacuum, and having an optical thickness equal to one quarter of the predetermined wavelength;

forming a plurality of openings in the elementary layers, the openings corresponding to regions to be engraved on the material, the openings uncovering selected portions of the material; and

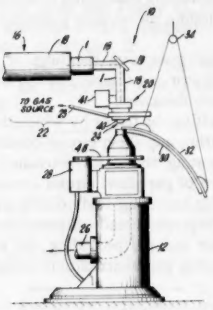
illuminating the material by a laser beam of sufficient power to engrave, by sublimation, the uncovered material portions, the plurality of dielectric of alternating indices forming a mirror for the laser beam, having a relatively high threshold of damage from the laser, and absorbing substantially no power from the laser beam.

4,078,165

SEMI-AUTOMATIC FEED LASER APPARATUS

William D. Tuttle, Farmingdale, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed May 3, 1976, Ser. No. 682,501
Int. Cl.[2] B23K 9/00
U.S. Cl. 219—121 L **23 Claims**



1. Gas assisted laser generating apparatus for cutting and scoring a workpiece mounted to a template, with spacer means therebetween when desired, comprising:

a gas assisted laser source;

means for substantially focusing laser radiation generated by said source at a predetermined point;

a generally hollow guide structure adapted for rotatable mounting to a suitable support member, with its longitudinal axis generally aligned with the focused laser radiation, said guide having an upper end adapted to partially support said workpiece/template assembly and to frictionally engage an edge of said template for defining the desired pattern;

a support member for supporting said guide, said support member including means for enabling rotation of said guide with respect to said support member;

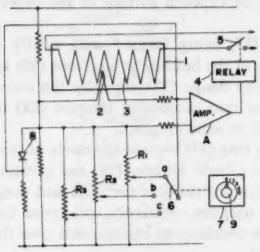
drive means mounted to a suitable support, operably coupled to said guide for providing rotational drive to said guide to rotate said guide with respect to said support member, such that when said workpiece/template assembly is positioned with said pattern edge of said template in frictional engagement with said upper end of said guide, said workpiece is generally automatically fed under said focused laser radiation while said generally automatic feed can be manually overridden when desired, and such that laser radiation penetrating said workpiece can defocus within said guide.

4,078,166

DEVICE FOR CONTROLLING THE TEMPERATURE OF THE FIXING MEANS IN THE ELECTRONIC PHOTOGRAPHIC COPYING MACHINE

Ko Kitamura, Hachioji; Mamoru Watanabe, Fuchu; Kimihiko Iwamura, Tokyo, and Kenichi Chino, Hachioji, all of Japan, assignors to Konishiroku Photo Industry, Co., Ltd., Tokyo, Japan

Filed Sep. 16, 1976, Ser. No. 723,810
Claims priority, application Japan, Sep. 23, 1975, 50-115844
Int. Cl.[2] H05B 1/00
U.S. Cl. 219—216 **4 Claims**



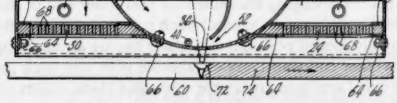
1. In an electronic photographic copying machine wherein a toner image is produced on copying paper and including a source of electric power, a first switching member, a fixing means being connected to said source of electric power through said first switching member and having a heating section used for melting the tone image produced on the copying paper by radiant heat thereof in a copying operation to fix the image, and a control means for keeping the temperature of the fixing means at a predetermined temperature level by turning on and turning off said first switching member; the improvement wherein said control means comprises a temperature detecting element being arranged at said heating section of said fixing means so as to detect the temperature thereof and effect operation of said first switching member, and a second switching member for selectively changing a predetermined image certain temperature of said fixing means from a first value at which the image on a few sheets of copying paper can be fixed to another value lower than said first value at which the image on subsequent sheets of copying paper can be fixed after the copying operation of said few sheets of copying paper is finished.

4,078,167

WELDING SHIELD AND PLASMA SUPPRESSOR APPARATUS

Conrad M. Banas, Bolton, Conn., and Harry C. Rogers, Jr., Berwyn, Pa., assignors to United Technologies Corporation, Hartford, Conn.

Filed Feb. 9, 1977, Ser. No. 767,110
Int. Cl.[2] B23K 9/00, 9/16
U.S. Cl. 219—121 R **12 Claims**



1. A welding enhancement apparatus to provide nonreactive gas over a weld zone and suppression gas through the path of a welding beam comprising:

a housing having an entrance port and capable of shielding a weld zone;

a structure wall which cooperates with the housing to form a first cavity therein and has an exit port aligned with the entrance port;

gas handling means for providing suppression gas to the first cavity and directing said gas across the path of the beam;

means for exhausting the suppression gas from the first cavity;

a base cooperating with the housing and structure wall to form a second cavity within the housing;

second gas handling means for providing a nonreactive gas to the second cavity; and

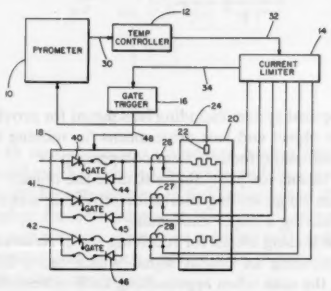
means for passing the nonreactive gas from the second cavity to the weld zone.

4,078,168

POWER CONTROL CIRCUIT

Richard A. Kelly, Prospect Heights, Ill., assignor to Flinn & Dreffein Engineering Company, Northbrook, Ill.

Filed Sep. 17, 1976, Ser. No. 724,386
Int. Cl.² H05B 1/02
U.S. Cl. 219—497 **9 Claims**



1. A system for phase angle regulation of electric power without excessive phase back applied to a process comprising:

(a) means for detecting a process condition related to the applied power and producing a signal representative thereof,

(b) means receiving said signal for comparing the value thereof against a preset value and for producing an error signal representative of the difference therebetween,

(c) means receiving said error signal for producing a DC signal of a fixed magnitude wherein the percent of time over a selected period the DC signal is produced is proportional to the duration of said error signal,

(d) means for controlling power applied to said process including at least one power switching device operated by application of said DC signal, said controlling means switching synchonously with the power wave form at a point thereon determined by the magnitude of said DC signal, and

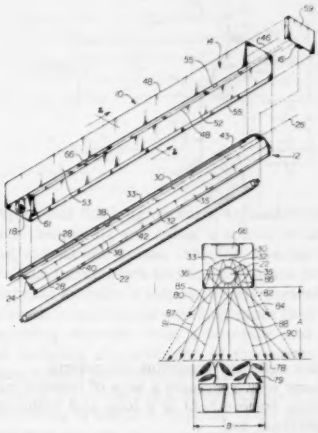
(e) means for limiting the power applied to said process to a preselected maximum by reducing the magnitude of said DC signal supplied to said controlling means thereby to produce phase back of the switching point of said switching device when excessive power is detected.

4,078,169

APPARATUS FOR PROMOTING PLANT GROWTH WITH ARTIFICIAL LIGHT

J. Delvin Armstrong, 2224-137th Pl. SE., Bellevue, Wash. 98005

Filed Aug. 23, 1976, Ser. No. 716,763
Int. Cl.² H05B 33/02
U.S. Cl. 362—122 **8 Claims**



1. Apparatus for promoting the growth of plants with artificial light, comprising:

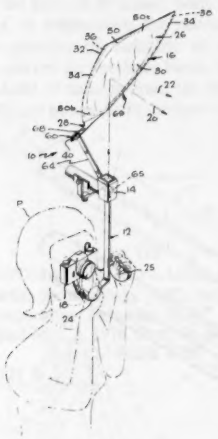
light reflector means, including socket means, adapted to receive an elongated light source operative to emit light along its longitudinal axis and over a 360° included angle transversely thereof, said light reflector means being symmetrical about its longitudinal centerline, which divides said light reflector means into two longitudinal sections, each section comprising at least three consecutively adjacent plane portions, a first plane portion being horizontally disposed, a second plane portion being positioned immediately adjacent said first plane portion and projecting approximately 30° downward therefrom, and a third plane portion being positioned immediately adjacent said second plane portion and projecting approximately 30° downward therefrom, so that said light reflector means approximates a parabola in cross-section, wherein the light source is positioned approximately at the focal point of said light reflector means, such that (1) the majority of the light energy emitted from the light source is delivered from said light reflector means along the longitudinal axis thereof and over a 60° included angle transversly thereof onto a light delivery plane, and (2) light energy is substantially uniformly delivered over a defined area, within which the plants are located, on said light delivery plane, said defined area, centered beneath said light reflector means, having a longitudinal dimension substantially equal to the length of the light source and a transverse dimension substantially equal to the vertical distance between said light delivery plane and said light reflector means; and

light reflector housing means open along the bottom thereof for supporting said light reflector means without interfering with said light energy emitted therefrom.

4,078,170
PHOTOGRAPHIC REFLECTOR ACCESSORY

Conrad Beebe Sloop, 9092 Bermuda Dr., Huntington Beach, Calif. 92646

Filed Nov. 6, 0975, Ser. No. 629,532
Int. Cl.[2] F21V 7/10
U.S. Cl. 362—322 3 Claims



1. Photographic reflector apparatus comprising:

a reflector frame which includes a wire of resilient material with a middle portion bent in a loop and with opposite wire end portions; and

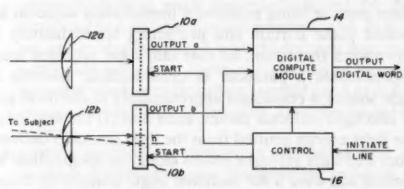
a reflector screen of flexible sheet material with a light-reflecting surface, said screen having a pair of opposite sides and a wire-engaging portion extending along each of said sides for engaging a different one of said wire end portions; and

means for supporting said reflector frame including a support frame, and clamp means for pressing the middle portion of said reflector frame against said support frame including a rounded member for closely receiving the bent middle portion of said reflector frame.

4,078,171
DIGITAL AUTO FOCUS

Norman L. Stauffer, Englewood, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jun. 14, 1976, Ser. No. 696,170
Int. Cl.[2] G01J 1/20
U.S. Cl. 250—201 20 Claims



1. Apparatus for providing an indication of the distance between the apparatus and an object, the apparatus comprising:

first detector array positioned to receive a first detection image of the object and to provide output signals indicative of radiation received;

second detector array positioned to receive a second detection image of the object and to produce output signals indicative of radiation received, the second detection image being displaced by a number *n* of detectors in the second detector array with respect to the position of the first detection image on corresponding detectors of the first detector array, the number *n* being indicative of the distance between the object and the first and second detector arrays; and

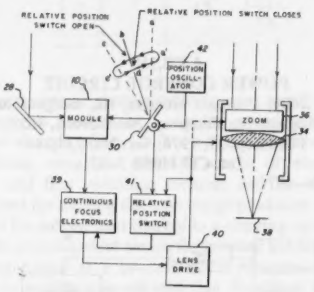
signal processing means for receiving the output signals from the first and second detector arrays including digitizing means for digitizing the output signals from the first and second detector arrays to produce first and second digitized representations of the first and second detection images, respectively; and

digital correlator means for comparing the first and second digitized representation and providing an output signal indicative of the number *n*.

4,078,172
CONTINUOUS AUTOMATIC FOCUS SYSTEM

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 19, 1976, Ser. No. 743,189
Int. Cl.[2] G01J 1/20
U.S. Cl. 250—201 16 Claims



7. In an optical system including lens means for providing an image of an object and lens drive means for moving the lens means, an automatic focus system comprising:

scanning means for providing a scan of the object;

correlation range sensing means for providing a correlation signal having a major extremum;

extremum sensing means for receiving the correlation signal and providing an output signal which has a first state during the scan when approaching each extremum which is more extreme than previous extrema and which changes from the first state to a second state during the scan upon the occurrence of each extremum which is more extreme than previous extrema, the last change of state of the output signal from the first to the second state being indicative of the occurrence of the major extremum;

relative position sensing means for sensing the positional relationship of the scanning means and lens means, the relative position sensing means providing an effect when the scanning means and the lens means occupy a predetermined positional relationship;

deadband means for providing a deadband period determined by the occurrence of the effect;

focus correction required means for providing a focus correction required signal if the last output signal first state occurs either before or after the deadband period;

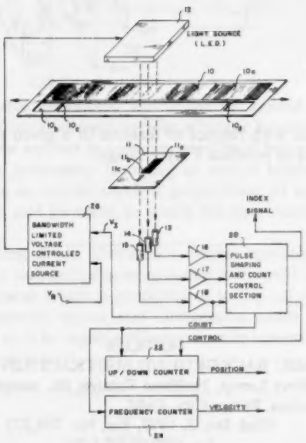
focus correction direction means for providing a focus correction direction signal indicative of a first direction if the last output signal first state occurs after the deadband period, and indicative of a second direction if the last output signal first state occurs before the deadband period; and

focus control means for controlling the lens drive means as a function of the focus correction required signal and the focus correction direction signal.

4,078,173
LIGHT AMPLITUDE CONTROL SYSTEM FOR POSITION AND MOTION TRANSDUCERS

Jack V. Fultz, Thousand Oaks, Calif., assignor to Pertec Computer Corporation, Los Angeles, Calif.

Filed Jun. 24, 1976, Ser. No. 699,248
Int. Cl.[2] H01J 3/14
U.S. Cl. 250—237 G 16 Claims



1. In an opto-electronic transducer having two members, one movable with respect to the other, and the other having at least one slit for transmission of light transmitted through said one member for determining at least one of two parameters consisting of position of said one member with respect to said other member and velocity of one with respect to the other, the combination comprising

at least one track in said first member containing information,

a controlled source of light stationary with respect to said second member,

means stationary with respect to said second member for detecting light transmitted through said one track from said source, and for producing an analog signal of an amplitude related to the intensity of transmitted light detected,

a second track in said first member disposed along side said one track for transmission of light from said source, the length of said second track being substantially equal to the length of said one track, said second track being transparent throughout substantially its entire length and having information only at positions of the operating region of said second track where said first member is not permitted to stop,

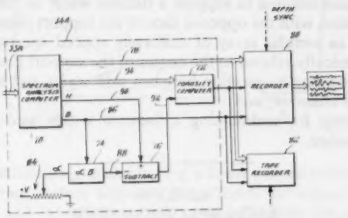
means for detecting light transmitted through said second track from said source and through said slit in said other member and for producing a feedback signal of an amplitude related to the intensity of light detected, and

control means including a low-pass filter responsive to said feedback signal for so controlling said source of light as to maintain the intensity of light from said source substantially constant.

4,078,174
NEUTRON BOREHOLE LOGGING CORRECTION TECHNIQUE

Leonard H. Goldman, Princeton, N.J., assignor to Schlumberger Technology Corporation, New York, N.Y.

Continuation of Ser. No. 549,582, Feb. 13, 1975, abandoned.
This application Jul. 28, 1976, Ser. No. 709,462
Int. Cl.[2] G01V 5/00
U.S. Cl. 250—270 10 Claims

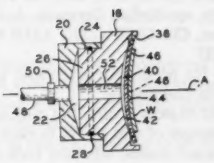


1. Apparatus for logging earth formations traversed by a borehole comprising a housing, a source of neutrons in said housing, at least one gamma radiation detector in said housing that is spaced apart from said source, means surrounding said detector that includes a material rarely present in a borehole and in earth formations in anything more than trace amounts for capturing neutrons from a borehole and for producing gamma radiation characteristic of that neutron capture for detection by said gamma radiation detector, means coupled to said detector for producing a representation of the neutron flux in the borehole in selective response to the amount of detected characteristic gamma radiation from said material and a representation of the concentration of a formation constituent element in response to detected gamma radiation, means for producing a representation of a constant of proportionality reflecting the relationship between predetermined representations of the concentration of said element and the neutron flux in a formation which does not contain said element, means for multiplying the produced neutron flux representation by said constant of proportionality to obtain an indication of the effect of borehole neutron capture produced gamma radiation on the produced element concentration representation, and means for subtracting said borehole effect indication from said produced element concentration representation.

4,078,175
APPARATUS FOR USE IN EXAMINING THE LATTICE OF A SEMICONDUCTOR WAFER BY X-RAY DIFFRACTION

James C. Fletcher, Administrator of the National Aeronautics and Space Administration, with respect to an invention of Donald L. Parker, and Wilbur A. Porter, both of College Station, Tex.

Filed Sep. 20, 1976, Ser. No. 724,874
Int. Cl.[2] G01N 23/20
U.S. Cl. 250—277 CH 1 Claim



1. In combination with an x-ray camera, an improved chuck for supporting a semiconductor for illumination by a beam of x-rays, including:

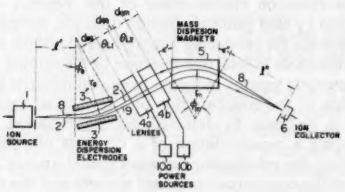
A. a chuck having
  a concave vacuum chamber characterized by a compound curve configuration having a singular radius of curvature, and
  an annular support surface circumscribing the periphery of the vacuum chamber and circumscribed by an annular lip;
B. a flexible support plate of a compound curve configuration seated on said annular surface having one face disposed in communicating relation with said vacuum chamber;
C. means adapted to support a flexible wafer in contiguous relation with the opposite face of the support plate including an annular array of uniformly spaced apertures concentrically related to the center of the support plate establishing communication between said wafer and said vacuum chamber; and
D. means for maintaining a vacuum within said vacuum chamber.

4,078,176

MASS SPECTROMETER

Hisashi Matsuda, Takarazuka, Japan, assignor to Hitachi, Ltd., Japan

Filed Mar. 26, 1976, Ser. No. 670,834
Claims priority, application Japan, Sep. 26, 1975, 50-115579
Int. Cl.[2] B01D *59/44;* H01J *39/34*
U.S. Cl. 250—296 **11 Claims**



1. A mass spectrometer comprising means for ionizing a sample to produce ions thereof, means for dispersing said ions according to their kinetic energies and mass numbers respectively to select ions having a specific mass number, means for generating a lens field to focus the dispersed ions having said specific mass number at a predetermined position which is disposed after said dispersion means, means for selectively electrically adjusting the intensity of said lens field, and means for detecting said focussed ions, said dispersion means being substantially free from focussing action of said dispersed ions having said specific mass number between said ionization means and said predetermined position.

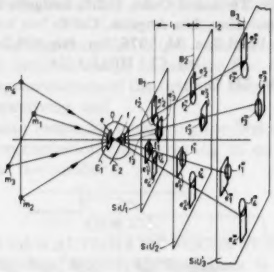
4,078,177

LAYER-WISE REPRODUCTION OF THREE-DIMENSIONAL OBJECTS BY SIMULTANEOUS SUPER-POSITION OF ENCODED IMAGES

Ulf Tiemens, Fahltskamp, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 2, 1976, Ser. No. 673,259
Claims priority, application Germany, Apr. 5, 1975, 2514988
Int. Cl.[2] G03B *41/16;* A61B *6/02*
U.S. Cl. 250—323 **12 Claims**

1. A method for producing layer-wise images of three-dimensional objects comprising:
  irradiating said objects in different directions from *m* points to record images of said object in each of a plurality of *n* of spaced apart planes, whereby each source contributes to the image recorded in each plane, to produce *m* superposition images, *m* and *n* being integers,
  equalizing the scale of said superposition images and aligning said superposition images *m* times to separately optically align portions thereof corresponding to the image produced by separate ones of said sources, to thereby produce *m* perspective images, and aligning said *m* perspective



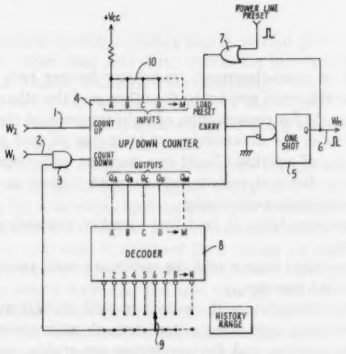
images with respect to features of a given plane of said object to produce a layer image.

4,078,178

DYNAMIC BACKGROUND SUBTRACTION CIRCUIT

Albert Robert Lowes, Hoffman Estates, Ill., assignor to Kevex Corporation, Foster City, Calif.

Filed Jan. 3, 1977, Ser. No. 756,372
Int. Cl.[2] G01T *1/00*
U.S. Cl. 250—336 **6 Claims**

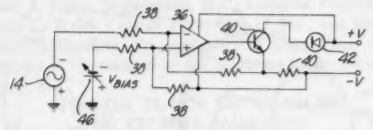


1. In a system for detecting and displaying radiation energy spectra, a method for improving display resolution by elimination of background noise comprising the steps of
  a. detecting and processing to a first series of pulses the radiation events occurring in a selected energy band of interest;
  b. detecting and processing to a second series of pulses the radiation events occurring in at least one selected background energy band whose background counts are comparable to the background counts in the said band of interest.
  c. counting the pulses of said first series;
  d. simultaneously subtracting from that count the pulses of said second series to produce an output pulse train that is the difference in the number of pulses between both series of pulses;
  e. and utilizing said output pulse train to drive a display.

4,078,179
MOVABLE INSTRUMENT WITH LIGHT EMITTING POSITION INDICATOR

Charles Eugene Everest, Santa Ana, Calif., assignor to Telatemp Corporation, Fullerton, Calif.

Filed Jul. 30, 1976, Ser. No. 710,124
Int. Cl.² G01J 5/00
U.S. Cl. 250—338 7 Claims



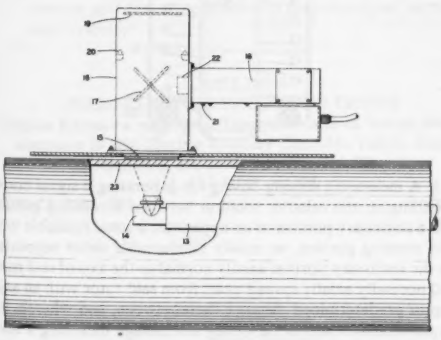
1. A movable instrument which can be utilized so as to detect a difference between various adjacent locations which differ from one another in a manner capable of being optically detected, said instrument including an optical sensing means for producing an output which is proportional to said difference between said locations in which the improvement comprises:

light emitting diode illumination means operatively connected to said optical sensing means for providing a level of brightness which is proportional to the output of said optical sensing means, said illumination means being located so as to be capable of being visually inspected as said instrument is used.

4,078,180
X-RAY INSPECTION OF WELDS

Donald T. Green, Mentor, Ohio, assignor to United States Steel Corporation, Pittsburgh, Pa.

Filed Mar. 17, 1976, Ser. No. 667,925
Int. Cl.² G01N 23/00
U.S. Cl. 250—358 R 15 Claims



1. A machine for nondestructive testing of welds, comprising:

a. means for mechanically traversing the length of a weld on one side of the test object with a source of X-rays;

b. on the other side of the object, and close to it, in the beam of the radiation, a grainless sheet of fluorescent material sensitive to X-rays;

c. a video camera coupled to the fluorescent screen;

d. a picture tube for display of the image transmitted by the video camera;

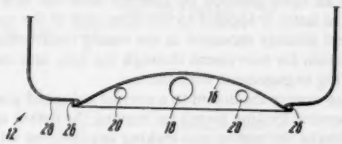
e. data generators for superimposing identifying indicia on the picture in the picture tube; and

f. means for recording the composite of the indicia and the picture in the picture tube.

4,078,181
RADIATION APPARATUS WITH REFLECTOR CASING

Helmut Mader, Bovenden, Germany, assignor to Dr. Kern GmbH, Gottingen, Germany

Filed Dec. 17, 1975, Ser. No. 641,491
Claims priority, application Germany, Feb. 12, 1975, 7504185[U]
Int. Cl.² G01J 1/00
U.S. Cl. 250—495 1 Claim

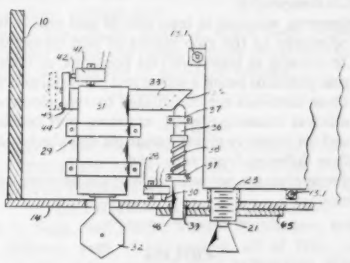


1. A radiation apparatus having a dome-shaped reflector and a supporting surface adjacent the reflector for supporting the reflector and extending radially outwardly from the reflector and ultraviolet and infrared radiation sources positioned in the reflector, the improvement characterized by the reflector being connected to the supporting surface and supported by a plurality of spaced-apart bridges which extend from adjacent the outer periphery of the reflector to the supporting surface to prevent substantial heat conduction between said reflector and said supporting surface, the reflector and the supporting surface being stamped integrally from a single piece of metal, and the reflector and the supporting surface being separated from each other by an air gap except at the bridges, the reflector having a front edge projecting outwardly beyond the supporting surface whereby hot air rising from the reflector is spaced from the supporting surface.

4,078,182
DESTRUCTIVE MECHANISM FOR AUTOMOBILE TAPE DECKS, RADIOS AND THE LIKE

Donald B. Arney, 12287 Fulton St., Maple Ridge, British Columbia, and Jon L. S. Buckle, 2245 Kedge Anchor Road, R.R. 1, Sydney, British Columbia, both of Canada

Filed Jun. 28, 1976, Ser. No. 700,204
Claims priority, application United Kingdom, Jul. 11, 1975, 29186/75
Int. Cl.² H02G 3/00
U.S. Cl. 307—10 AT 5 Claims



1. A destructive device for radio equipment for automobiles and the like, which radio equipment has at least one threaded sleeve through which a radio equipment control member extends, the device comprising:

(a) a casing open at one end adapted to be secured inside the vehicle,

(b) means for securing the radio equipment in the casing with the threaded sleeve projecting out of the open end thereof,

(c) a removable face plate covering the open end of the casing and having an opening through which the threaded

sleeve projects, and having a hole adjacent said threaded sleeve,

(d) a nut threadedly engaging the sleeve adapted to be tightened against the face plate for securing the face plate against the open end of the casing,

(e) an over-load power source mounted in the casing and connected in an over-load circuit with the equipment circuitry,

(f) a first normally closed contact switch in the over-load circuit mounted in the casing positioned so as to be operated to an open position by contact with the face plate when the latter is applied to the open end of the casing,

(g) a detent slidably mounted in the casing confronting the hole therein for movement through the hole into and out of locking engagement with the nut,

(h) a spring urging the detent to a normal unlocked position,

(i) key-operated locking means for moving the detent against the action of the spring into locking engagement with the nut, and a

(j) normally open switch mounted in the casing and connected in the over-load power circuit in series with the first mentioned electrical switch adapted to be closed by the locking means when the latter is operated to move the detent into locking engagement with the nut.

4,078,183

CONTROL DEVICES OF THE RELAY TYPE

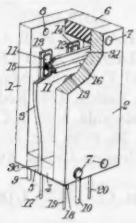
Jacques Lewiner, Saint-Cloud, and Gérard Dreyfus, Villebon sur Yvette, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed Dec. 9, 1975, Ser. No. 639,193

Claims priority, application France, Dec. 10, 1974, 74 40506

Int. Cl.² H01H *1/04*

U.S. Cl. 307—112 **19 Claims**



1. Switch comprising:

three elements, wherein at least one of said elements is mobile relatively to the two others of said elements and is able to occupy at least two rest positions, at least one of said rest positions being a stable rest position, and wherein said three elements are constituted by two electrodes and one electret consisting in an insulating part bearing positive and/or negative electric charges, the algebraic sum of which is different from zero, and;

means for applying a potential difference between said electrodes.

4,078,184

ELECTRIC CONDUIT ASSEMBLY FOR TRANSMITTING ELECTRIC POWER AT UHV AND EHV LEVELS

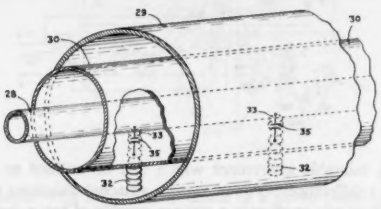
James D. M. Phelps, North Canton, Ohio; Alan J. McElroy, Bronx, N.Y., and Vincent Caleca, Fairlawn, N.J., assignors to Interpace Corporation, Parsippany, N.J.

Filed Oct. 8, 1975, Ser. No. 620,822

Int. Cl.² H01B *11/02*

U.S. Cl. 307—147 **11 Claims**

1. An electric conduit assembly for transmitting therealong bulk electric power at high voltage levels on the order of 300 kv and higher using only air as the insulative medium comprising: a conduit connectable to ground potential during use of the conduit assembly; an elongated electric conductor disposed within said conduit extending lengthwise thereof and connectable to a source of high potential during use of the conduit assembly so as to establish an intense electric field between said conductor and conduit; and electric field gradient reducing means comprising a tubular metal shield interposed between and spaced from said conductor and conduit and electrically floating, and means defining lumped impedances



coupling together said shield and conductor at spaced intervals along their lengths to effect reduction in the electric field gradient between said conductor and conduit and raising of the conductor-to-conduit flashover voltage as compared to an otherwise similar conduit assembly without said tubular metal shield and lumped impedances, said means defining lumped impedances being wholly within the region between said shield and said conductor.

4,078,185

MEASURING SENSING DEVICE

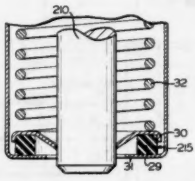
Gunther Singbartl, Hannover, Germany, assignor to WABCO Westinghouse GmbH, Hannover, Germany

Filed May 3, 1976, Ser. No. 682,579

Claims priority, application Germany, May 10, 1975, 2520855

Int. Cl.² H02K *19/24*

U.S. Cl. 310—168 **6 Claims**



1. A measuring sensing device for generating a signal corresponding to the relative rotation between a rotating portion and a stationary portion of an apparatus, a rotor rotatable with said rotating portion, an axially displaceable stator supported on the stationary portion axially normal to the axis of said rotor and normally axially spaced apart from said rotor with an axial gap of predetermined distance therebetween, and wherein the improvement comprises a spring assemblage including a resilient axially deformable washer type spring element coaxially surrounding the stator for providing a predetermined degree of frictional adhesion therebetween, said stator being axially displaceable relative to said spring element out of an initial axial position by an actuating force sufficient for overcoming said frictional adhesion, in one direction to a stop position in abutting contact with said rotor and in which stop position said spring element is resiliently axially deformed out of a normal shape an amount corresponding to the amount of axial displacement of the stator, said spring element being effective, upon release of said actuating force and consequent return of the spring element to its normal shape, for locking onto said stator and causing axial movement in unison with each other in a direction opposite to said one direction to a predetermined axial position in which an axial gap of predetermined length is

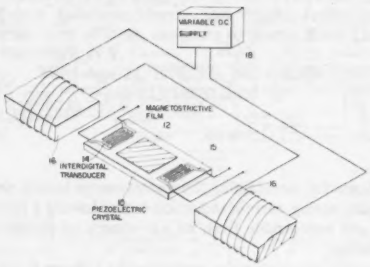
provided between the rotor and the stator as determined by the amount of axial movement of the stator in said opposite direction effected by return of the spring element to its said normal shape.

4,078,186

MAGNETICALLY TUNED, SURFACE ACOUSTIC WAVE DEVICE

Vincent J. Folen, Washington, D.C.; Carmine Vittoria, Bowie; Denis C. Webb, College Park, both of Md., and Kenneth L. Davis, Alexandria, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Oct. 21, 1976, Ser. No. 734,690
Int. Cl.[2] H01L *41/10, 41/14*
U.S. Cl. 310—313 **10 Claims**



1. In a SAW device comprising a substrate capable of supporting surface wave propagation and having an input transducer and an output transducer both mounted on a surface of said substrate, the improvement comprising:

a thin film of magnetostrictive material bonded to said surface of said substrate in the path of propagation of surface waves generated by said input transducer; and

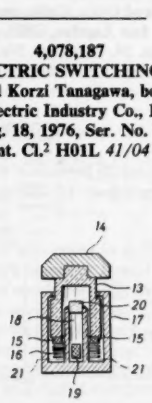
means for applying a continuously variable, D.C. magnetic field to said film to continuously vary the signal propagation velocity.

4,078,187

PIEZOELECTRIC SWITCHING DEVICE

Hajime Kanisawa, and Korzi Tanagawa, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Aug. 18, 1976, Ser. No. 715,551
Int. Cl.[2] H01L *41/04*
U.S. Cl. 310—319 **3 Claims**



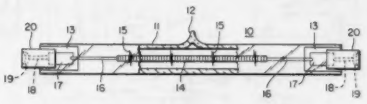
1. A contactless switching device comprising an operating key, a piezo-electric element for converting the mechanical displacement made by said operating key into an electric signal, a complementary MOS integrated circuit for shaping and amplifying the electric signal generated from said piezo-electric element, a permanent magnet arranged movable along with said operating key, and a floating permanent magnet arranged movable in response to the first-said permanent magnet and adapted to impinge against said piezo-electric element to generate said electric signal.

4,078,188

REGENERATIVE-CYCLE INCANDESCENT LAMP CONTAINING A DUAL-ADDITIVE

Jack Martin, Paramus, and Avinash D. Kulkarni, Montclair, both of N.J., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed Mar. 30, 1976, Ser. No. 671,851
Int. Cl.[2] H01K *1/50*
U.S. Cl. 313—222 **8 Claims**



1. A regenerative-cycle electric incandescent lamp that is designed to be operated at a selected voltage and have a design life of over 1,000 hours when operated at said voltage, said lamp comprising;

a sealed light-transmitting envelope of elongated configuration that contains an inert fill gas and a filament which is composed essentially of tungsten wire,

means supporting said filament in spaced-apart relationship with said envelope,

lead-in conductor means extending into said envelope and connected to said filament, and

means within said envelope for establishing and sustaining a tungsten-halogen interaction within the lamp during the operation thereof which inhibits discoloration of all portions of the envelope by vaporized tungsten regardless of whether the lamp is operated in a horizontal or non-horizontal position and even when the lamp is operated at a voltage in excess of said selected voltage,

said discoloration-inhibiting means consisting essentially of predetermined quantities of two different additives which (a) provide halogen vapors within the lamp when the filament is energized and (b) are selected from the group consisting of SnI_4 in combination with elemental iodine, SnI_4 in combination with CH_2Br_2, SnI_4 in combination with mercury bromide, and mercury iodide in combination with CH_2Br_2,

wherein the SnI_4 additive, when used, is present in an amount of at least about 0.05 micromole per milliliter of envelope volume, and

wherein the CH_2Br_2 additive, when used, is present in an amount within the range of from about 0.03 to 0.1 micromole per milliliter of envelope volume.

4,078,189

CONTROL SYSTEM FOR REGULATING THE TORQUE AND SPEED OF AN ELECTRIC MOTOR INCLUDING STATIC FREQUENCY DETECTOR FOR SPEED DETECTION AND REGULATION

James N. Nash, New Berlin; Ronald W. Morters, and Lawrence A. Millonzi, both of Milwaukee, all of Wis., assignors to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Jun. 22, 1976, Ser. No. 698,763
Int. Cl.[2] H02P *5/40*
U.S. Cl. 318—227 **10 Claims**

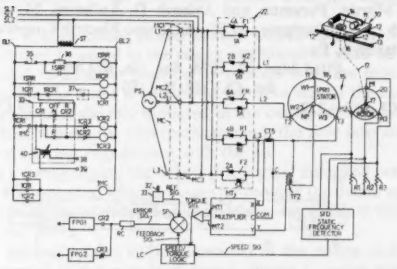
1. In a control system for regulating the speed and torque of an alternating current induction motor energizable from an alternating current source through a controlled rectifier bank, in combination:

an operator's control movable to selected positions to effect motor operation and for providing a reference signal related to a selected position;

means for providing a torque signal related to motor torque;

means for sensing the instantaneous frequency of the current in said rotor and for providing a speed signal related to instantaneous motor speed;

means for combining said torque signal and said speed signal and for providing a feedback signal related thereto; and



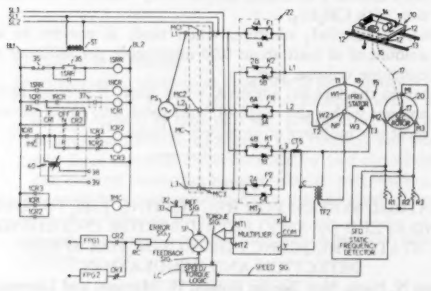
means for comparing said feedback signal and said reference signal and for providing an error signal for regulating said controlled rectifier bank to thereby maintain torque constant for a selected position of said operator's control.

4,078,190

CONTROL SYSTEM FOR REGULATING THE SPEED OF AN ELECTRIC MOTOR INCLUDING STATIC FREQUENCY DETECTOR FOR SPEED DETECTION AND REGULATION

James N. Nash, New Berlin, Wis., assignor to Harnischfeger Corporation, West Milwaukee, Wis.

Filed Jun. 22, 1976, Ser. No. 698,772
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **11 Claims**



1. Means for ascertaining the instantaneous rotor speed of an alternating current induction motor having a rotor and a stator and energizable from a source of alternating current electric power comprising:

first means for detecting the instantaneous waveform of the current flow in said motor rotor;

second means for extracting the fundamental frequency from said waveform and for providing a square wave signal related thereto;

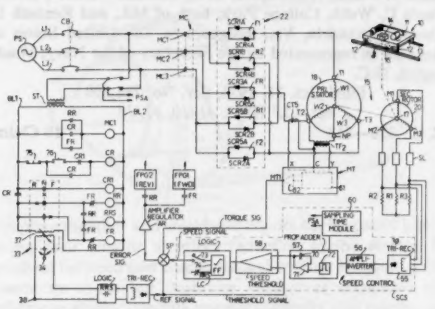
and third means for receiving and converting said square wave signal into an analog voltage signal proportional to speed.

4,078,191

CONTROL SYSTEM FOR REGULATING THE TORQUE AND SPEED OF AN ELECTRIC MOTOR

Ronald W. Morters, and Lawrence A. Millonzi, both of Milwaukee, Wis., assignors to Harnischfeger Corporation, W. Milwaukee, Wis.

Filed Jun. 22, 1976, Ser. No. 698,773
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **24 Claims**



1. Means for ascertaining the instantaneous torque delivered by an alternating current induction motor having a rotor and a stator and energizable from an a.c. source of electric power comprising:

means for measuring the instantaneous voltage in said stator and for providing a first electric signal related thereto;

means for measuring the instantaneous current in said stator and for providing a second electric signal related thereto;

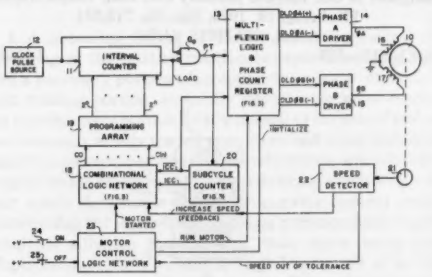
and means for receiving and multiplying said first and second electric signals and for providing a third electric signal related to the instantaneous wattage in the stator and proportional to the instantaneous torque developed by the rotor.

4,078,192

SYNTHESIZER FOR MULTIPHASE WAVEFORMS

Jack V. Fultz, Thousand Oaks, Calif., assignor to Pertec Computer Corporation, Los Angeles, Calif.

Filed Jun. 24, 1976, Ser. No. 699,613
Int. Cl.² H02P 5/40
U.S. Cl. 318—227 **21 Claims**



1. A synthesizer for at least one multiphase waveform comprising

a stable source of clock pulses,

an interval counter for counting predetermined numbers of said clock pulses to produce sequential phase timing signals, each phase timing signal being timed counting one of a plurality of predetermined numbers of clock pulses as preset into said counter,

programming means for storing a set of numbers to be preset into said interval counter, one number for each unique

interval to be timed by said interval timer in producting said phase timing signals for use in synthesizing at least one multiphase waveform,

a source of at least one control signal,

means responsive to said phase timing signals and said control signal for selecting a different one of said numbers stored by said programming means to be preset into said counter in response to each unique condition of said phase timing signals and said control signals, and

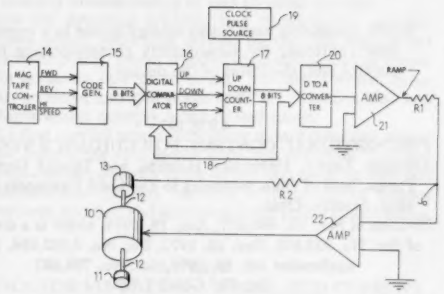
synthesizing means responsive to said phase timing signals and including at least one bistable element for combining intervals timed by said interval counter, said bistable element being alternately clocked by said timing signals in a predetermined cyclic pattern, thus synthesizing at the output of said bistable element a multiphase waveform.

4,078,193

CAPSTAN SPEED CONTROL SYSTEM

David Robert Anderson, Murray, and Vaughn Junior Jenkins, Bountiful, both of Utah, assignors to Sperry Rand Corporation, New York, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,849
Int. Cl.[2] H02P 5/00
U.S. Cl. 318—317 **1 Claim**



1. A tape-transport system having a capstan for transporting tape past a read-write head, comprising in combination:

a motor connected to the capstan for driving the capstan in a first or second direction;

control means providing speed and direction command signals;

generator means connected to the output of said control means and responsive to said speed and direction commands from said control means to provide a digital output indicative of the desired speed and direction of the capstan;

a digital comparator connected at one input to the output of said generator means for receiving said digital output therefrom;

an up-down counter;

a clock-pulse source connected to said up-down counter to cause said up-down counter to count in synchronism with the occurrence of clock pulses from said source;

a digital-to-analog converter connected to the output of said up-down counter for continuously converting the output count of said counter to an analog voltage;

conductor means coupling the output of said counter back to another input of said digital comparator;

said digital comparator for comparing the digital outputs from said generator means and said counter and connected at an output to said counter for providing a signal to cause said counter to change its count until its digital count equals the digital output from said generator means;

tachometer generator means connected to said motor for providing an output voltage proportional to the instantaneous velocity of said motor and having a polarity opposite to that of said analog voltage; and

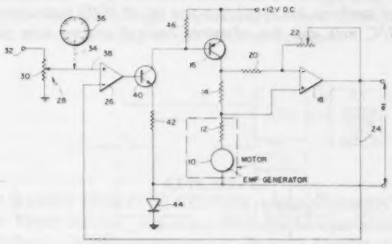
summing junction means connected to said converter and said tachometer generator means for summing the output voltages therefrom and connected to said motor whereby said motor receives a drive voltage only when the tachometer voltage and said analog voltage differ in amplitude.

4,078,194

ARRANGEMENT FOR CONTROLLING THE SPEED OF A MOTOR

Eugene P. Johnson, Jr., Arlington, Mass., assignor to Micro Communications Corporation, Waltham, Mass.

Filed Apr. 28, 1976, Ser. No. 681,144
Int. Cl.[2] H02P 5/00
U.S. Cl. 318—331 **10 Claims**



1. An arrangement for controlling the speed of a motor comprising, in combination, a motor with commutator and brushes in contact with said commutator; means for measuring the back EMF of said motor and having an output signal corresponding to the undistorted average value of said back EMF, said undistorted average value being substantially proportional to the true speed of said motor; comparator means having a first input connected to said output of said measuring means; means for applying to a second input of said comparator means a signal corresponding to a desired speed of said motor, said comparator comparing said first and second input and having an output corresponding to the difference of said first and second inputs, said difference comprising an error voltage at the output of said comparator means; and motor driving means connected between the output of said comparator means and said motor for driving said motor with current to minimize said error voltage; said motor having a rotor carrying said commutator, the resistance of said rotor across said brushes varying between upper and lower limits during one rotation of the rotor, said commutator comprising a plurality of commutator segments, the variation of said resistance across said brushes being dependent on said segments becoming shorted by said brushes and remaining unshorted when said rotor rotates, said average value corresponding to the average of equivalent resistance across said brushes during one revolution of said rotor, said undistorted average value of said back EMF being independent of said variation of said rotor resistance.

4,078,195

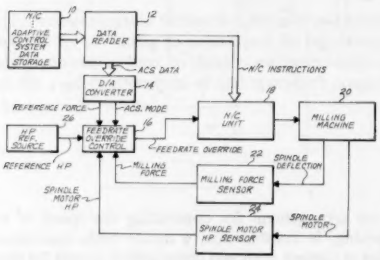
ADAPTIVE CONTROL SYSTEM FOR NUMERICALLY CONTROLLED MACHINE TOOLS

Richard A. Mathias, Renton; Lyle C. Adams, Maple Valley, and Edward N. Miller, Seattle, all of Wash., assignors to Macotech Corporation, Seattle, Wash.

Filed Jan. 13, 1976, Ser. No. 648,640
Int. Cl.[2] G05B 13/00
U.S. Cl. 318—561 **23 Claims**

1. An improved adaptive control system for use in combination with a numerically-controlled machine tool including an N/C unit capable of controlling the machine tool in a sequence of desired operational steps to provide a desired machining

process in response to a set of N/C instructions contained in an N/C storage medium, the N/C unit further including input means responsive to an override signal to modify at least one selected operation of the machine tool; an N/C storage medium containing a set of N/C instructions for a desired machining process which have been computed for a hypothetical machine tool having a predetermined operational capability, and further containing adaptive control system data including a reference value of at least one selected machining process variable which has been computed for operation of the hypothetical machine tool, the adaptive control system data further including a plurality of universal adaptive control variables containing information sufficient to allow the reference value of the selected machining process variable to be recomputed in accordance with the operational capability of the specific machine tool; and data reading means coupled with the N/C storage medium for supplying the set of N/C instructions to the N/C unit and the adaptive control system data to the



improved adaptive control system, the improved adaptive control system comprising:

a. storage means including machine constant data representing the operational capability of the specific machine tool with which the improved adaptive control system is utilized,

b. a machining process sensor coupled with the machine tool for providing an output signal representing the actual value of the selected machining process variable,

c. set-up means recomputing the reference value in the adaptive control system data in accordance with the universal adaptive control variables and said machine constant data to obtain a new reference value,

d. control means comparing said new reference value with said output signal from said machining process sensor to obtain an override signal, and

e. means coupling said override signal to the input means of the N/C unit to allow modification of the selected operation of the machine tool.

4,078,196

DIGITAL VALVE AND PUMP CONTROL SYSTEM

Moti Thadani, Mt. Prospect, Ill., assignor to Vapor Corporation, Chicago, Ill.

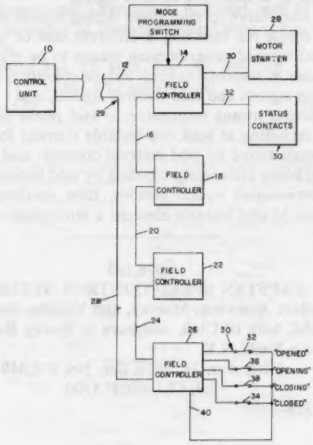
Filed Mar. 1, 1976, Ser. No. 662,459
Int. Cl.² G08C *15/06*; G05B *11/32*
U.S. Cl. 318—562 **12 Claims**

1. A system for digitally controlling a plurality of electrically operative devices, the system comprising:

a plurality of field controllers each having its respective output connected in circuit with a device for controlling the operation thereof;

a control unit removably located from, and connected to the field controllers for communicating simultaneously therewith on a two-wire loop;

respective means located at each electrically operated device for sensing its operational status; and



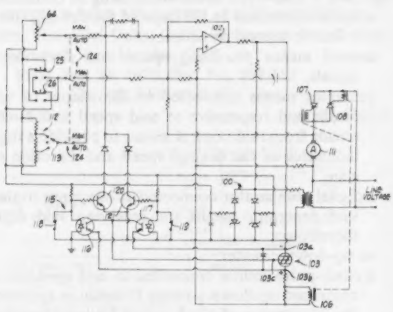
means connecting each status sensing means to a respective field controller for subsequently communicating to the control unit, the status of the device.

4,078,197

PROPORTIONAL CONTROL FOR GUIDANCE SYSTEM

Abraham Zeewy, University Heights, and Donald Geringer, Parma, both of Ohio, assignors to The Cecil Equipment Company, Medina, Ohio

Division of Ser. No. 498,477, Aug. 19, 1974, which is a division of Ser. No. 318,493, Dec. 26, 1972, Pat. No. 3,883,956. This application Jul. 19, 1976, Ser. No. 706,687
Int. Cl.² G05G *5/00*
U.S. Cl. 318—626 **4 Claims**



1. In an electrical circuit for controlling an apparatus-positioning motor controlled by a motor-driving circuit, a disabling circuit, comprising:

an optical transistor having an emitter, a collector, and a light-emitting diode,

the emitter and collector being in electrical connection with the motor-driving circuit whereby conduction by said optical diode disables the motor-driving circuit,

a normally closed switch which is opened at a predefined limit of travel of the positioning motor, connected across the light-emitting diode of said optical transistor,

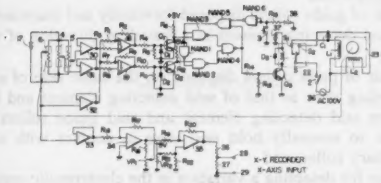
whereby when a voltage is impressed upon the light-emitting diode and said switch is opened, said optical transistor conducts thereby disabling the positioning motor.

4,078,198

APPARATUS FOR REPEATING THE SAME PROCESS

Takeo Murakosi, and Toshiyuki Tanno, both of Katsuta, Japan, assignors to Hitachi, Ltd., Japan

Filed Nov. 25, 1975, Ser. No. 635,083
Claims priority, application Japan, Nov. 27, 1974, 49-135511
Int. Cl.[2] G05G 5/00
U.S. Cl. 318—627 8 Claims



1. An apparatus for repeating the same process, comprising a first and a second setting means for respectively setting a first and a second extreme point of a range, an electric motor, a movable body whose physical quantity is varied through the drive by said motor, means for generating another displacement quantity corresponding to said physical quantity,

means for detecting whether said displacement quantity exists within said range defined by said first and second extreme points, means responsive to said detecting means for actuating said motor to shift said displacement quantity to move into said range upon the detection that said displacement quantity is out of said range,

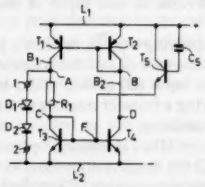
and a first control means responsive to said detecting means for controlling said motor upon the detection that said displacement quantity exists within said range so that said displacement quantity varies in a reciprocative manner between said first and second extreme points of said range.

4,078,199

DEVICE FOR SUPPLYING A REGULATED CURRENT

Claude Chapron, Caen, and Jean-Claude Kaire, St-Germain-la-Blanche Herbe, both of France, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 21, 1976, Ser. No. 678,867
Claims priority, application France, Apr. 24, 1975, 75 12809; Mar. 26, 1976, 76 08862
Int. Cl.[2] G05F 1/60
U.S. Cl. 323—1 13 Claims



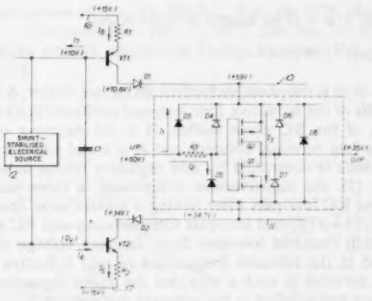
2. A device for supplying a regulated supply current to an integrated circuit to be powered, which integrated circuit comprises current injectors and at least two supply terminals for the application thereto of a supply current, the device comprising two current paths connected between two common supply terminals, a first current dividing circuit coupled to said two current paths and which defines a substantially fixed ratio between the currents in the two current paths, and a coupling circuit coupled to said two current paths and which provides current-dependent coupling between the two current paths so as to stabilize the currents in the two paths at a specific value, the coupling circuit comprising a second current dividing circuit which couples the two currents paths, each of said current dividing circuits having an input terminal and an output terminal, means connecting the input terminal of the second current dividing circuit to the output terminal of the first current dividing circuit via an impedance, and means connecting the input terminal of the first current dividing circuit to the output of the second current dividing circuit whereby the two current dividing circuits provide a coupling between the two current paths in a manner such that the open loop gain from the input terminal of the first current dividing circuit to the output terminal of the second current dividing circuit is greater than unity, and wherein the integrated circuit to be powered, viewed between its two power supply terminals, is included in the device as at least one semiconductor junction which also determines the stabilizing point and is connected to shunt said impedance and the input circuit of the second current dividing circuit so that when energised it causes a voltage drop which is greater than the voltage drop across the input circuit of the second current dividing circuit upon energisation.

4,078,200

CURRENT LIMITING CIRCUIT ARRANGEMENTS

Grant Edgar Ritchie, and John Malcolm Morrison, both of Edinburgh, Scotland, assignors to Ferranti Limited, Hollinwood, England

Filed Mar. 7, 1977, Ser. No. 775,051
Int. Cl.[2] G05F 1/58
U.S. Cl. 323—9 11 Claims



1. A circuit arrangement to be connected to an electrical supply and having a supply conductor and a return conductor, respectively, to be maintained at a first and a second reference potential level, and between the conductors there being connected at least one device to be at least partially protected from damage by an excessive current flow therethrough, and also having connected to one such conductors current limiting means including a diode and a transistor, with the diode and the base-collector junction of the transistor to be in series between the conductors and the electrical supply for the conductors, and the emitter to be connected via a resistor to a point to be maintained at a third reference potential level, the transistor to be connected in a grounded-base configuration with the maximum possible collector current defined by the maximum possible emitter current, with the maximum possible emitter current in turn defined by the magnitude of the resistor and the difference between the third reference potential level and the potential level of the emitter, the diode being provided to block any possible forward collector-base current, by the diode becoming reverse-biased and the potential level of the associated conductors rising above the required reference value.

4,078,201

OSCILLATOR CIRCUIT FOR GENERATING A SIGNAL WHOSE FREQUENCY IS REPRESENTATIVE OF THE PHASE SHIFT OF A FOUR TERMINAL NETWORK

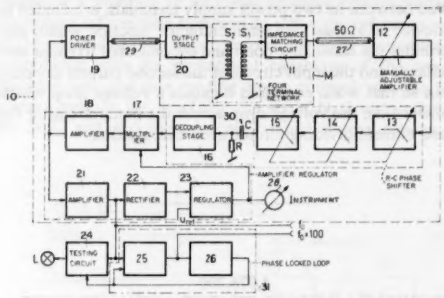
Werner Buser, Basel, Switzerland, assignor to BBC Brown, Boveri & Company Limited, Baden, Switzerland

Filed Jun. 16, 1976, Ser. No. 696,627

Claims priority, application Switzerland, Jun. 16, 1975, 7759/75

Int. Cl.² G01R *33/12*

U.S. Cl. 324—233 **6 Claims**



1. In an oscillator circuit of the type which generates a signal whose frequency is representative of the phase shift of an inductive four terminal network, which network is located, in series with an amplifier/regulator means, in the feed back circuit of an RC phase shifter oscillator and is dimensioned to satisfy the following conditions:

$$\phi(\omega) + \phi = O \text{ (or integral multiples of } 2\pi) \quad (1)$$

$$|F(\omega)| \cdot |H| \cdot A = | \quad (2)$$

wherein $\phi(\omega)$ is the phase shift of the RC phase shifter, ϕ is the phase shift of the inductive four terminal network, $F(\omega)$ is the damping of the RC phase shifter, H is the damping of the inductive four terminal network and A is a real amplification factor which is controlled by said regulator means to satisfy equation (2), the improvement comprising: a three-member decoupled RC low-pass filter having a transmission function $F(p) = 1/(1+pT)^3$, said low-pass filter defining said RC phase shifter such that said low-pass filter dampers voltage surges generated at the resonant frequencies of said inductive four terminal network in such a way that the above Equations (1) and (2) are not satisfied at the resonant frequencies.

4,078,202

APPARATUS FOR DETECTING WIRE JOINT

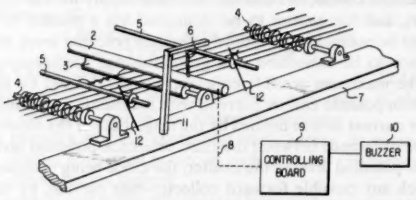
Satoru Nishi, Kishiwada, and Katsumasa Tanaka, Ono, both of Japan, assignors to Kobe Steel, Ltd., Kobe, Japan

Filed Jun. 21, 1976, Ser. No. 698,409

Claims priority, application Japan, Feb. 25, 1976, 51-20343

Int. Cl.² G01R *27/26*

U.S. Cl. 324—61 R **6 Claims**



1. An apparatus for detecting a welded joint, a disconnected part and/or entangled part of a metallic wire traveling continuously by detecting a variation in an electrostatic capacity between a detecting element and the wire comprising:

a. a detecting element supported above said continuously traveling wire so as to be displaceable when pressed upwardly by the metallic wire,

b. an auxiliary roller disposed at a position opposite to said detecting element with said traveling wire intervening therebetween,

c. a pair of guide rollers disposed forwardly and rearwardly of said detecting element in a traveling direction of the wire,

d. a pair of press rollers disposed on the same side of said traveling wire as that of said detecting element and between said detecting element and said guide rollers in order to normally hold said wire in contact with said auxiliary roller, and

e. means for detecting a variation in the electrostatic capacity between said detecting element and said wire.

4,078,203

CONTROLLED FREQUENCY DIVISION FREQUENCY DIVIDER CIRCUIT

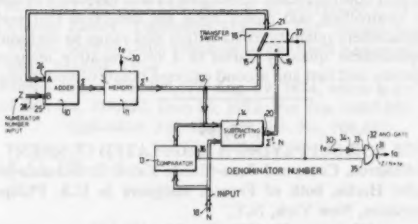
Wolfgang Borst, Schwieberdingen, Germany, assignor to Robert Bosch GmbH, Stuttgart, Germany

Filed Sep. 10, 1976, Ser. No. 721,952

Claims priority, application Germany, Sep. 18, 1975, 2541595

Int. Cl.² H03K *21/00, 23/06*

U.S. Cl. 328—39 **5 Claims**



1. Controlled frequency converter circuit to provide controlled division of the frequency of an input signal (f_e) by a fraction (Z/N) having

an adder-memory (**10, 11**);

means (**30**) applying input pulses (f_e) representing said input signal to be divided to one input of said adder-memory (**10, 11**);

means (**25, 26**) applying signals in binary pulse form representing the numerator (Z) of the frequency division ratio to a numerator input (B) of said adder-memory (**10, 11**);

means (**24**) applying a transfer number to a transfer input (A) of said adder-memory;

said adder-memory (**10, 11**) adding, upon each pulse of the input signal (f_e) the number appearing at the transfer input (A) to the numerator number (Z) applied to the numerator input (B) of the adder-memory (**10, 11**), and providing at its output (**12**) a sum signal ($\Sigma\pi$) upon occurrence of each pulse of the input signal (f_e);

and logic means (**13, 14, 16**) controlling transfer of the output from the adder-memory (**10, 11**) to said transfer input (A) as determined by said logic means,

wherein the logic means includes

a comparator (**13**) having a control input;

means (**18**) applying signals in binary pulse form representing the denominator (N) to said control input of the comparator and forming one comparison input thereof, the other comparison input of said comparator being connected to the output (**12**) of the adder-memory (**10, 11**);

and controlled switch means (**16**) connecting the output (**12**)

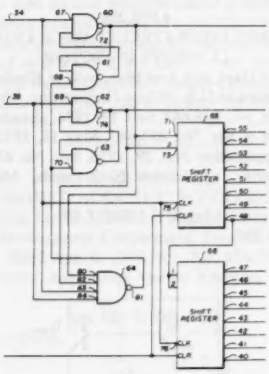
of the adder-memory (10, 11) and the transfer input (A) thereof, said comparator (13) controlling said controlled switch means (16) to control transfer of the output from the adder-memory (10, 11) fed back to said transfer input (A) and providing an output when the comparison effected in said comparator (13) between the denominator signal (N) applied to the control input and the output sum ($\Sigma\pi$) from the adder-memory (10, 11) applied thereto has a predetermined relationship.

4,078,204

DI-PHASE PULSE RECEIVING SYSTEM

John A. Gauthier, Brockville, Canada, assignor to GTE Automatic Electric (Canada) Limited, Brockville, Canada

Filed Jan. 31, 1977, Ser. No. 764,099
Int. Cl.² H03K *5/00, 5/156*
U.S. Cl. 328—21 **7 Claims**



1. In a di-phase pulse receiving system of the type which receives a plurality of transmitted serial di-phase data bits and of the type which includes a positive peak detector for providing a first pulse upon detecting a positive di-phase signal portion and a negative peak detector for providing a second pulse upon detecting a negative di-phase signal portion, a control means for converting the serial di-phase data bits into parallel data bits having corresponding discrete logic levels, said control means comprising:

first set means coupled to the positive peak detector and responsive to the first pulses for being set upon the detection of a positive di-phase signal portion,

second set means coupled to the negative peak detector and responsive to the second pulses for being set upon the detection of a negative di-phase signal portion, and

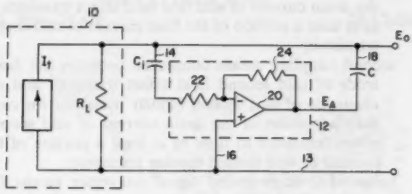
shift register means having a first input coupled to said first set means, a second input coupled to said second set means, a clock input coupled to the positive peak detector for being clocked by the trailing edge of the first pulses, and a plurality of parallel outputs, said shift register means being responsive to the coincidence of said first and second set means being set upon being clocked to thereby shift a first logic level to said parallel outputs and responsive to only said first set means being set upon being clocked to thereby shift a second logic level to said parallel outputs.

4,078,205

ELECTRONIC FILTER CIRCUIT

Michael Marion Van Schoiack, Bellevue, Wash., assignor to Sundstrand Data Control, Inc., Redmond, Wash.

Filed Nov. 3, 1975, Ser. No. 624,806
Int. Cl.² H03F *1/34*
U.S. Cl. 330—107 **23 Claims**



1. An *n*-order active shunt filter comprising:

terminal means for receiving an input signal from a signal source;

an *n*-1 order active network connected across said terminals and responsive to said input signal; and

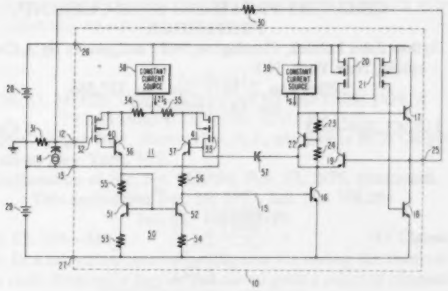
capacitor means, operatively connected between said active network means and said terminal means, for generating a shunt current in cooperation with said *n*-1 order active network.

4,078,206

DIFFERENTIAL AMPLIFIER

Brian Crowle, Ashford, England, assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 664,811, Dec. 29, 1975, abandoned.
This application Feb. 11, 1977, Ser. No. 767,958
Claims priority, application United Kingdom, Feb. 24, 1975, 7660/75
Int. Cl.² H03F *3/16, 3/45*
U.S. Cl. 330—253 **11 Claims**



1. An amplifier disposed on a monolithic die comprising:

first and second terminals for application of an energizing potential therebetween;

third and fourth terminals for application therebetween of an input signal potential referred to said energizing potential;

a fifth terminal;

first and second field effect transistors of a first conductivity type, having respective gate electrodes respectively connected to said third terminal and to said fourth terminal, having respective source and drain electrodes with respective channels therebetween, their source electrodes coupled to each other and direct current conductively coupled to said first terminal;

first and second bipolar transistors of a second conductivity type, each having base and emitter and collector elec-

trodes, said first and said second conductivity types being complementary to each other, the collector electrodes of said first and said second bipolar transistors being respectively connected to the source electrode of said first field effect transistor and to the source electrode of said second field effect transistor;

first coupling means connected between the drain electrode of said first field effect transistor and the base electrode of said first bipolar transistor for causing at least a portion of the drain current of said first field effect transistor to flow as at least a portion of the base current of said first bipolar transistor;

second coupling means connected between the drain electrode of said second field effect transistor and the base electrode of said second bipolar transistor for causing at least a portion of the drain current of said second field effect transistor to flow as at least a portion of the base current of said second bipolar transistor;

balanced-to-single-ended signal converter means for converting the balanced emitter currents of said first and second bipolar transistors to single-ended form for application to said fifth terminal;

current mirror amplifier means being included in said signal converter means having an input terminal connected to the emitter electrode of said first bipolar transistor, having a common terminal connected to said second terminal, and having an output terminal connected to said fifth terminal; and

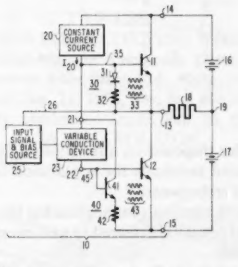
a connection of the emitter electrode of said second bipolar transistor to said fifth terminal, included within said signal converter means, said first bipolar transistor co-acting with said first field effect transistor to provide a composite device with higher transconductance for given area on the monolithic die than would be possible by widening the channel of said first field effect transistor, and said second bipolar transistor co-acting with said second field effect transistor to provide a composite device with higher transconductance for given area on the monolithic die than would be possible with widening the channel of said second field effect transistor.

4,078,207

PUSH-PULL TRANSISTOR AMPLIFIER WITH DRIVER CIRCUITRY PROVIDING OVER-CURRENT PROTECTION

Arthur John Leidich, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Jan. 7, 1977, Ser. No. 757,555
Int. Cl.² H03F *3/26*
U.S. Cl. 330—273 **5 Claims**



1. An amplifier comprising:

an interconnection point adapted for coupling to a load circuit;

first, second and third bipolar transistors of a first conductivity type, each having base and emitter electrodes with a base-emitter junction therebetween and having a collector electrode, the emitter electrode of said first transistor and the collector electrode of said second transistor being connected to said interconnection point, the collector and base electrodes of said third transistor being respectively connected to the base electrode of said first transistor and to the base electrode of said second transistor;

means for applying an operating voltage between the emitter electrode of said second transistor and the collector electrode of said first transistor;

a source of substantially constant quiescent biasing current;

a variable conduction device with a variable conduction path between first and second electrodes thereof and with a control electrode, the conductance of said conduction path varying in response to a control signal applied to said control electrode, said first electrode of said device being connected to said source of substantially constant quiescent biasing current and being direct coupled to the base electrode of said first transistor and said second electrode of said device being direct coupled to the base electrode of said second transistor;

first and second linear resistive elements, said first linear resistive element being connected between the emitter electrodes of said second and said third transistors; and

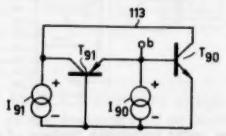
a semiconductor junction connected in series with said second linear resistive element between the base and emitter electrodes of said first transistor with said junction poled for simultaneous conduction with the base-emitter junction of said first transistor.

4,078,208

LINEAR AMPLIFIER CIRCUIT WITH INTEGRATED CURRENT INJECTOR

Cornelis Maria Hart, and Arie Slob, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 505,663, Sep. 13, 1974, abandoned, which is a continuation of Ser. No. 253,348, May 15, 1972, abandoned. This application Jan. 29, 1976, Ser. No. 653,472
Claims priority, application Netherlands, May 22, 1971, 7107040
Int. Cl.² H03F *3/04*
U.S. Cl. 330—296 **6 Claims**



3. A linear amplifier circuit comprising first and second D.C. coupled complementary transistors each having emitter, base and collector, D.C. means connecting the collectors of the first and second transistors, means connecting the base of the first transistor to the emitter of the second transistor, and current injector means coupled directly to the base of the first transistor and directly to the collector of the second transistor for biasing them into operation.

4,078,209

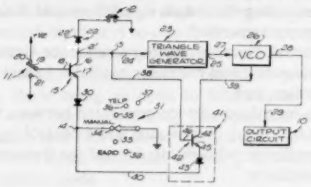
SOUND COMMUNICATION SYSTEM WITH SPEAKER PROTECTION FOR FREQUENCIES BELOW A PREDETERMINED MINIMUM

C. Alfred Paladino, Costa Mesa, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Mar. 11, 1977, Ser. No. 776,628
Int. Cl.² H03B *23/00*
U.S. Cl. 331—47 **2 Claims**

1. A siren system comprising: an input oscillator having an input lead and an output lead; switch means having one side connected to said input oscillator input lead and another side connected to a point of a first predetermined potential, said input oscillator being set in oscillation and turned off upon actuation and deactuation of said switch means to change the potential on said input oscillator input lead from a second

predetermined potential to a third predetermined potential, respectively, said second predetermined potential appearing on said input oscillator input lead when said switch means is actuated, said third predetermined potential appearing on said input oscillator input lead when said switch means is deactuated, said input oscillator producing a periodic signal on the said output lead thereof when said input oscillator oscillates; a voltage controlled oscillator (VCO) having an input lead, an output lead, and a third lead, said VCO producing a periodic signal on said output lead thereof in accordance with the amplitude of a signal on said input lead thereof, said VCO peri-



odic signal having at least a low frequency in the audio range; an output circuit for producing sonic output of said low frequency, said output circuit having an input lead connected from said VCO output lead; and auxiliary means connected from said input oscillator input lead for connecting said VCO third lead to said second predetermined potential, said input oscillator having a construction to cause the frequency of said VCO to fall to a level to cause speaker damage if not corrected, connection of said VCO third lead to said second predetermined potential by said auxiliary means causing said VCO to cease oscillation promptly and to protect against speaker damage.

4,078,210

MULTI-MODED ACOUSTIC WAVE OSCILLATOR

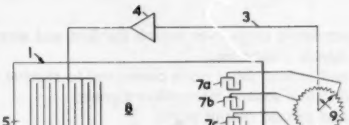
Meirion Francis Lewis, Malvern, England, assignor to National Research Development Corporation, London, England

Filed Apr. 8, 1976, Ser. No. 674,875

Claims priority, application United Kingdom, Apr. 10, 1975, 14862/75

Int. Cl.² H03B 5/30

U.S. Cl. 331—107 A **9 Claims**



1. A multi moded acoustic wave oscillator comprising an amplifier and a feedback loop connecting between the amplifier input and output and incorporating an acoustic delay line, said delay line comprising a substrate able to support acoustic waves, an interdigital finger comb input transducer for launching acoustic waves along a track in the substrate, a plurality of interdigital finger comb output transducers arranged on one side of the input transducer with each output transducer across a different part of the track at a different distance from the input transducer and each being capable of supporting oscillation at a number of harmonic frequencies, said difference in distance being less than one half wavelength at the transducer centre frequency, and switching means for cyclically connecting each output transducer in turn to the amplifier so that by sequential operation of said switching means, the oscillator may be caused to oscillate at any one of said harmonic frequencies, such number being much greater than the number of output transducers.

4,078,211

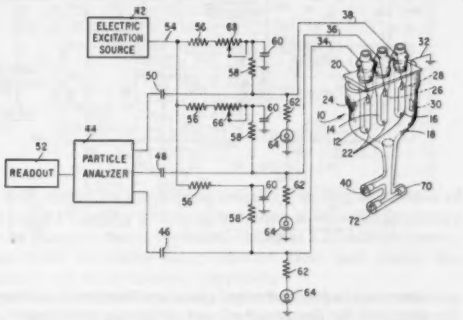
METHOD AND APPARATUS FOR BALANCING PARTICLE DETECTING SIGNALS GENERATED IN A PARTICLE STUDY DEVICE HAVING MULTIPLE APERTURES

Millard D. Longman, Jr., Hialeah, Fla., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Filed Sep. 29, 1976, Ser. No. 727,959

Int. Cl.² G01N 27/00

U.S. Cl. 324—71 CP **10 Claims**



1. A method for balancing a particle study device for studying particles in suspension, said device including, means having at least two apertures through which said particles in suspension are passed, means for passing an electric current through said apertures simultaneously with passage of a particle through said apertures, and detecting means responsive to variations of the impedance caused by particle passage for generating electric signals in response to said particle passage, said method including the steps of:

passing particles in suspension from the same particle suspension through each of said apertures;

generating signals in response to the passage of said particles; and

adjusting said current passing through said apertures substantially to equalize said signals.

4,078,212

DUAL MODE FREQUENCY SYNTHESIZER FOR A TELEVISION TUNING APPARATUS

Robert Morgan Rast, Mercerville, N.J., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 662,096, Feb. 27, 1976, abandoned. This application Jan. 10, 1977, Ser. No. 758,294

Int. Cl.² H04B 1/16

U.S. Cl. 325—421 **19 Claims**

1. In a television receiver, apparatus for tuning the receiver to a radio frequency carrier associated with a selected channel comprising:

means for generating a reference frequency signal;

phase comparator means including first and second inputs and a frequency control output, said reference frequency signal being coupled to said first input;

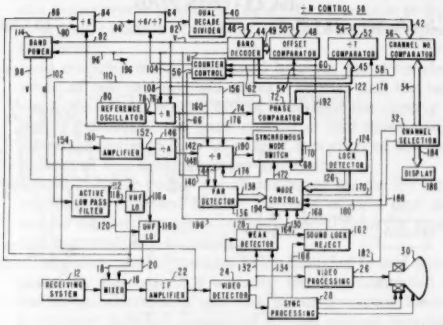
oscillator means coupled to said frequency control output for generating a local oscillator signal;

means responsive to said local oscillator signal and said radio frequency carrier for generating an intermediate frequency signal including a picture carrier;

switching control means responsive to said local oscillator signal and to said intermediate frequency signal for selectively providing either a first signal whose frequency equals the frequency of the local oscillator signal divided by a first number corresponding to the selected channel or a second signal including a frequency component proportional to said intermediate frequency picture carrier to

said second input of said phase comparator means, the ratio of the frequency of said local oscillator signal and said first number being substantially equal to a nominal value of said frequency component;

means coupled to said switching control means for supplying control signals thereto when said signals coupled to said first and second inputs of said phase comparator



means are in predetermined phase and frequency relationship and the frequency of said frequency component is within a predetermined deviation from its nominal value;

said switching control means initially coupling said first signal to said phase comparator and thereafter decoupling said first signal from said phase comparator and coupling said second signal to said phase comparator in response to said control signals.

4,078,213

TRANSMITTER SELECTION CIRCUIT FOR A RADIO OR TELEVISION RECEIVER

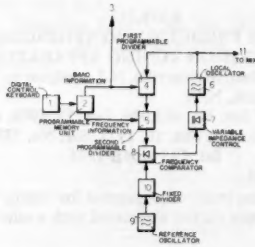
Armando Campioni, Turin, Italy, assignor to Indesit Industria Elettrodomestici Italiana S.p.A., Turin, Italy

Filed Jun. 30, 1976, Ser. No. 701,269

Claims priority, application Italy, Jul. 11, 1975, 68805/75

Int. Cl.[2] H04B 1/16

U.S. Cl. 325—459 **3 Claims**



1. A radio or television receiver having a channel selection circuit for selecting a channel among a plurality of channels belonging to first and second different wavebands, said circuit comprising:

a control device operable to produce control signals the values of which depend on the channel to be selected,

at least one programmable frequency divider which is programmed with a plurality of predetermined division factors and which comprises first and second programmable frequency divider circuits connected in cascade with one another, said programmable frequency divider being programmed with two different division factors selected in dependence on whether the selected channel is in the first waveband or in the second waveband,

different control signals from said control device, controlling said programmable frequency divider to divide by a selected one of said plurality of predetermined division factors,

a local oscillator,

means connecting said frequency divider to the output of said local oscillator, whereby said frequency divider provides an output signal which is divided down from the oscillator frequency to a value dependent on the division factor of said divider determined by the control signal from said control device,

a frequency comparator,

means connecting the output signal from said divider to said frequency comparator,

a reference oscillator producing a reference signal,

means connecting said reference oscillator to said frequency comparator, and

a variable impedance device connected between the output of said frequency comparator and a control input of said local oscillator, whereby to control the frequency of said local oscillator.

4,078,214

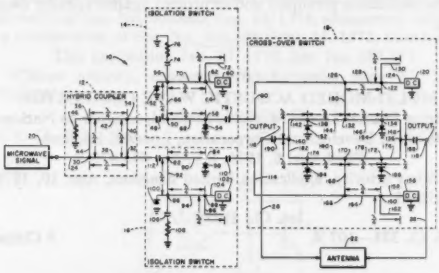
MICROWAVE CROSSOVER SWITCH

Lawrence A. Beno, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 673,557, Apr. 5, 1976, Pat. No. 4,031,488. This application Oct. 22, 1976, Ser. No. 734,892

Int. Cl.[2] H01P 1/15

U.S. Cl. 333—7 D **24 Claims**



1. A microwave cross-over switch for first and second microwave signals comprising:

a. first and second input ports connected to receive respective first and second microwave signals;

b. first and second output ports;

c. a first D.C. bias source having a positive mode of operation when generating a positive current, a negative mode of operation when generating a negative current and a first bias port; said positive and negative currents being coupled to said first input port through said first bias port;

d. a second D.C. bias source having a positive mode of operation when generating a positive current, a negative mode of operation when generating a negative current and a second bias port; said positive and negative currents being coupled to said second input port through said second bias port;

e. first means providing an electrical interconnection from said first input port to said second output port;

f. a first diode connected between said first electrical interconnection means and a reference potential, said first diode being an open to said first signal when said first D.C. bias source is in said negative mode, said first diode being a short to said first signal when said first D.C. bias source is in said positive mode;

g. second means providing an electrical interconnection from said first input port to said first output port;

h. a second diode connected between said second electrical

interconnection means and a reference potential, said second diode being an open to said first signal microwave when said first D.C. bias source is in said positive mode;

i. third means providing an electrical interconnection from said second input port to said second output port;

j. a third diode connected between said third electrical interconnection means and a reference potential, said third diode being an open to said second microwave signal when said second D.C. bias source is in said positive mode, said third diode being a short to said second D.C. bias source is in said negative mode;

k. fourth means providing an electrical interconnection from said second input port to said first output port;

l. a fourth diode connected between said fourth electrical interconnection means and a reference potential, said fourth diode being an open to said second microwave signal when said second D.C. bias source is in said negative mode, said fourth diode being a short to said second microwave signal when said second D.C. bias source is in said positive mode.

4,078,215

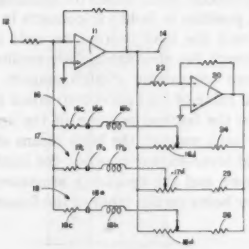
ELECTRONIC FILTER CIRCUIT

Billy Herman Vinson, Simi Valley, Calif., assignor to Altec Corporation, Anaheim, Calif.

Filed Nov. 26, 1976, Ser. No. 745,448

Int. Cl.[2] H03H *7/10, 7/14;* **H03F** *1/32;* **H03G** *9/20*

U.S. Cl. 333—70 R **4 Claims**



1. A filter circuit for selectively filtering the output of an amplifier comprising:

a plurality of passive filter units connected in parallel between an inverting output and the input of the amplifier, each of said filter units including a variable resistor, the variable tap and one end of each of said variable resistors being connected between the inverting output of the amplifier and the remaining elements of the associated filter unit,

a unity gain amplifier, the input of said unity gain amplifier being connected to the inverting output of said first mentioned amplifier; and

a fixed resistor connected between the other end of each of said variable resistors and an inverting output of said unity gain amplifier, the resistance of each of said resistors being equal to that between the ends of its associated variable resistor, whereby the voltages at the connections between the other ends of said variable resistors and said fixed resistors is held to zero by said unity gain amplifier.

4,078,216

CIRCUIT FOR THE PARALLEL COUPLING OF AUDIO FREQUENCY CENTRAL-CONTROL TRANSMITTING STATIONS IN A WAVE BAND FILTER CONSTRUCTION

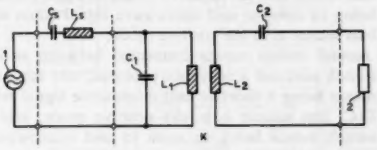
Paul Kamber, Luzern, Switzerland, assignor to LGZ Landis & Gyr Zug AG, Zug, Switzerland

Filed Oct. 24, 1975, Ser. No. 625,370

Claims priority, application Switzerland, Nov. 27, 1974, 15705/74

Int. Cl.[2] H03H *7/04, 7/08, 7/46, 7/14*

U.S. Cl. 333—76 **7 Claims**



1. A circuit for electromagnetically coupling the output of an audio frequency generator operating at an audio frequency to an electrical mains system operating at a system frequency, said audio frequency being different from said system frequency and its harmonics, comprising:

an ironless transformer having a first inductance coil coupled magnetically to a parallel second inductance coil, said first and second inductance coils being electrically separated;

a first capacitor connected in parallel with said first inductance coil to form a generator-side parallel resonant circuit for connection to the audio frequency generator; and

a second capacitor connected in series to said second inductance coil to form a system-side resonant circuit for connection to the electrical mains system;

said generator-side resonant circuit and said system-side resonant circuit each being tuned to the output frequency of the audio frequency generator.

4,078,217

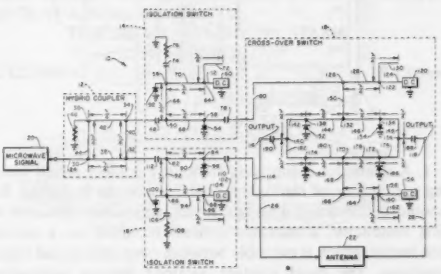
MICROWAVE ISOLATION SWITCH

Lawrence A. Beno, Camarillo, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 673,557, April 5, 1976, Pat. No. 4,031,488. This application Oct. 22, 1976, Ser. No. 734,899

Int. Cl.[2] H01P *1/10*

U.S. Cl. 333—97 S **10 Claims**



1. A microwave isolation switch for a microwave signal comprising:

a. an input port connected to receive a microwave signal;

b. an output port;

c. a D.C. bias source having a positive mode of operation when generating a positive current, a negative mode of operation when generating a negative current, and a bias port;

d. a first switch port connected to said input port;

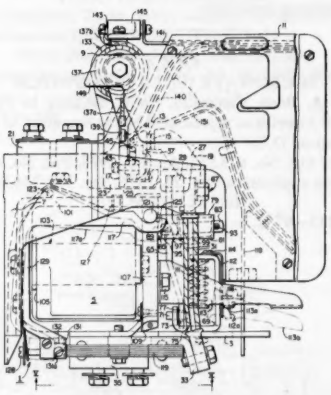
e. a second switch port connected to said output port;
f. a third switch port connected to said bias port;
g. a substantially fifty ohm resistor connected between said third switch port and a reference potential;
h. first means for electrically interconnecting said first and second switch ports;
i. second means for electrically interconnecting said first and third switch ports;
j. first switch means connected between said third switch port and a reference potential, said first switch means being a short to said microwave signal when said D.C. bias source is in the negative mode, said first switch means being an open to said microwave signal when said D.C. bias source is in the positive mode;
k. second switch means connected between said second switch port and a reference potential, said second switch means being a short to said microwave signal when said D.C. bias source is in the positive mode, said second switch means being an open to said microwave signal when said D.C. bias source is in the negative mode;
l. when said D.C. bias source is in the positive mode said second switch means causes said microwave signal to be reflected and terminated in said fifty ohm resistor, when said D.C. bias source is in the negative mode said microwave signal is passed to said output port.

4,078,218

MAGNETIC CONTACTOR

Alfred W. Hodgson, Orchard Park, and James D. Collins, Elma, both of N.Y., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 657,428, Feb. 14, 1976, abandoned. This application Jun. 14, 1976, Ser. No. 695,677
Int. Cl.² H01H *67/02*
U.S. Cl. 335—128 **18 Claims**



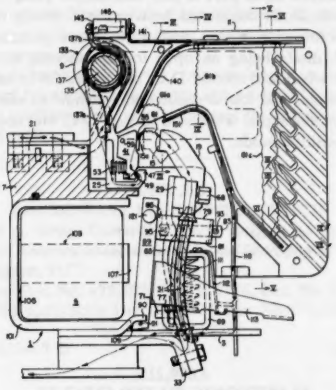
1. A contactor comprising stationary contact means including a plurality of stationary contact sections including fixed contact sections and a pivot contact section and mounted on a first conductor, a movable contact mounted on a movable conductor which is movable between open and closed contact positions, the fixed contact sections having substantially aligned contact surfaces facing the movable contact, the first conductor having a pivot edge on which the pivot section is mounted, the pivot edge being aligned with the contacting surfaces, spring means between the pivot edge and the contact surfaces for holding the pivot section against the pivot edge and for biasing the contact surface of the pivot section out of alignment with those of the stationary contact sections on the side of the movable contact, and electromagnetic means for moving the movable conductor to the closed position and operative means for moving the movable conductor to the open position when the electromagnetic means is deenergized.

4,078,219

OVERCURRENT LATCH FOR MAGNETIC CONTACTOR

Alfred W. Hodgson, Orchard Park, N.Y., assignor to Westinghouse Electric Corporation, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 657,427, Feb. 11, 1976, abandoned. This application Aug. 13, 1976, Ser. No. 714,219
Int. Cl.² H01H *9/20*
U.S. Cl. 335—167 **15 Claims**



1. An electromagnetic contactor comprising stationary and movable contacts, electromagnetic means for moving the movable contact to the closed position, operative means for moving the movable contact to the open position when the electromagnetic means is deenergized, the electromagnetic means comprising an operating armature movable between energized and deenergized positions, latch means for latching the armature in the energized position to hold the contacts in the closed position in the event the load current exceeds a predetermined value even though the electromagnetic means is deenergized, the latch means comprising a latch magnet responsive to a predetermined value of load current to effect movement of the latch means to the latched position of the armature, a frame mounting the latch magnet, the latch means also comprising a latch lever and lever-engaging roller, the latch lever being on one of the frame and the operating armature, and the lever-engaging roller being on the other of the frame and the operating armature.

4,078,220

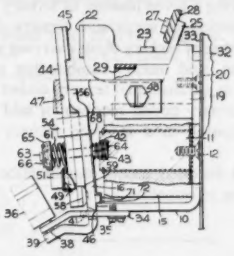
CONTACTOR HAVING MEANS TO INHIBIT CONTACT WELDING CAUSED BY JAMMING OF THE ARMATURE

Paul M. Gallatin, Brookfield, Wis., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Dec. 27, 1976, Ser. No. 754,575
Int. Cl.² H01F *7/08*
U.S. Cl. 335—270 **4 Claims**

1. In an electromagnetically actuated circuit controlling device, a magnetic yoke, a magnetic core affixed to said yoke, an electrical coil surrounding said core, a clapper magnetic armature, means for mounting said armature for pivotal movement about a line of engagement between said armature and said yoke, said armature when in closed position completing, together with said yoke and said core, a closed magnetic circuit, a stationary contact, a movable contact carried by said armature and adapted to engage said stationary contact, return spring means for resiliently biasing said armature toward open position, a thin nonmagnetic shim carried by said armature in a position wherein it is disposed in said closed magnetic circuit

between said armature and said core and having a gasket-retaining portion, and a dirt-shielding gasket compressed within said gasket-retaining portion against said armature and



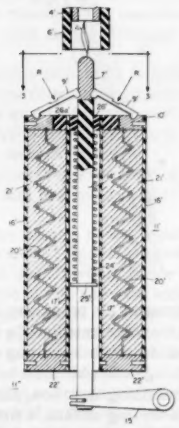
covering the opening between the opposed surfaces of said yoke and said armature adjacent said line of engagement to thereby prevent accumulation of foreign particles in said opening.

4,078,221

LOAD-BREAK SWITCH AND CURRENT-LIMITING FUSE COMBINATION

Frederick J. Kozacka, South Hampton, N.H., assignor to Gould, Inc., Newburyport, Mass.

Filed Jan. 6, 1977, Ser. No. 757,449
Int. Cl.[2] H01H *71/20*
U.S. Cl. 337—168 **7 Claims**



1. In a load-break switch and current-limiting fuse combination, the combination of

(a) a load-break switch having relatively movable contacts;

(b) a current-limiting fuse electrically connected in series with said load-break switch, said current-limiting fuse having a casing including a radially outer insulating wall and a coaxial radially inner insulating wall defining a space of annular cross-section therebetween, the fusible elements and the granular arc-quenching filler of said current-limiting fuse being arranged inside said space of annular cross-section; and

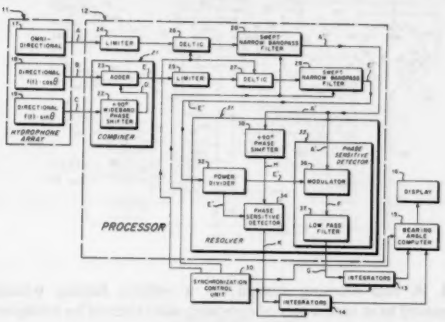
(c) an operating mechanism for said load-break switch arranged at least in part inside of said radially inner insulating wall of said current-limiting fuse.

4,078,222

DIRECTION DETERMINING APPARATUS

Thomas E. Woodruff, Nashua, N.H., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 20, 1969, Ser. No. 878,506
Int. Cl.[2] G01S *3/80*
U.S. Cl. 340—6 R **11 Claims**



1. Direction determining apparatus comprising:

sensor array means for sensing impinging acoustic signals from a remotely located source including an omnidirectional sensor providing an omnidirectional signal and a pair of orthogonally arranged directional sensors providing directional signals;

combiner means for vectorially combining said directional signals for providing a combiner output signal having a phase shift relative to said omnidirectional signal of a magnitude indicative of the bearing angle of the source;

resolver means receiving said omnidirectional signal and said combiner means output signal for providing a pair of resolver output signals indicative respectively of the cosine and the sine of the phase shift; and

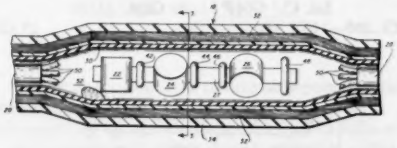
computer means receiving said cosine and sine resolver output signals for providing an output signal indicative of the bearing angle.

4,078,223

GEOPHONE AND SEISMIC CABLE ASSEMBLY

Booth B. Strange, Houston, Tex., assignor to Western Geophysical Co. of America, Houston, Tex.

Filed Sep. 10, 1976, Ser. No. 722,860
Int. Cl.[2] G01V *1/16*
U.S. Cl. 340—7 R **8 Claims**



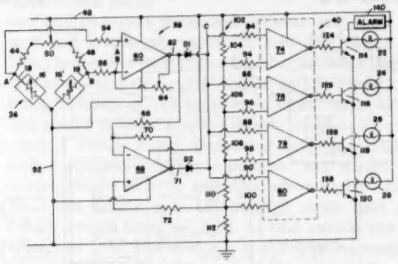
7. A seismic cable assembly having a longitudinal axis substantially horizontally disposed in operative contact with the earth's surface and including a plurality of sets of geophones, each said set including at least two members, the direction of maximum sensitivity of each member of said set of geophones differing from one another, and all of said directions being substantially perpendicular to said longitudinal axis; and

each member of any one set of geophones is provided with a connection to the same electrical circuit.

4,078,224
ELECTRONIC ROLL WARNING SYSTEM FOR VEHICLES

Lawrence A. Mize, 161 Minorca Way, Millbrae, Calif. 94030

Filed Jun. 25, 1976, Ser. No. 700,412
Int. Cl.[2] G08B 21/00
U.S. Cl. 340—52 H 7 Claims



1. A roll warning system for a vehicle having wheels mounted to at least a pair of opposing sides thereof by a suspension unit, said warning system comprising:

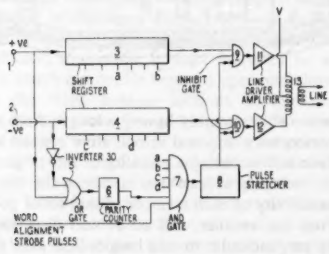
means coupled to said suspension unit for dynamically sensing the distortion imparted to said suspension unit by the weight of said vehicle and for generating therefrom a first linear signal representative of a transverse weight shift from the one side of said vehicle to the opposing side thereof;

means for displaying warning indicia to a driver and including a plurality of warning devices, said warning indicia being representative of the amount of said transverse weight shift; and means interconnecting said sensing means and said display means for operating said display means in response to said first signal, said operating means including amplifying means for receiving said first signal and for generating therefrom a voltage proportional to an absolute value of said transverse weight shift and detecting means for detecting a plurality of predetermined levels of said voltage, said detecting means being coupled to said display means to activate at least one of said warning devices in response to a corresponding one of said detected levels.

4,078,225
ARRANGEMENT AND A METHOD FOR ERROR DETECTION IN DIGITAL TRANSMISSION SYSTEMS

Anthony Jessop, Harlow, England, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jul. 15, 1976, Ser. No. 705,729
Claims priority, application United Kingdom, Jul. 28, 1975, 31572/75
Int. Cl.[2] G06F 11/10; G08C 25/00
U.S. Cl. 340—146.1 AG 17 Claims



1. A method for detecting errors in ternary coded transmission systems by performing parity checking operations comprising the steps of

replacing, at a ternary coded transmitter of said system, a predetermined allowable combination of successive ternary digits having a given number of ternary digits with a unique combination of successive ternary digits having said given number of ternary digits carrying parity checking information, said unique combination normally not being allowed in a transmitted ternary coded digit stream;

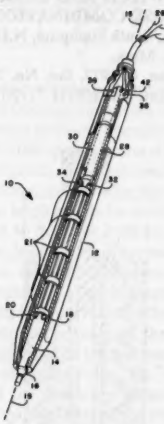
decoding, at a ternary coded receiver of said system, said unique combination in a received ternary coded digit stream; and

recognizing said decoded unique combination as carrying parity checking information.

4,078,226
INPUT APPARATUS FOR DYNAMIC SIGNATURE VERIFICATION SYSTEMS

Errol P. EerNisse; Cecil E. Land, and Jay B. Snelling, all of Albuquerque, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 16, 1977, Ser. No. 778,189
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 SY 13 Claims



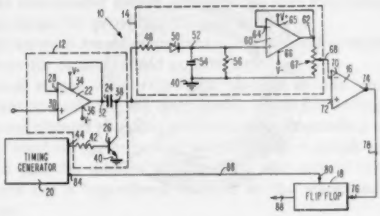
1. A writing instrument for producing at least two output signals each of which is representative of a different directional component of an individual's handwriting action for signature verification, comprising: a flexible shaft having a longitudinal axis for holding an inscribing tip to be applied by a writer using said instrument to a writing surface, a first piezoelectric element fixedly secured to and extending along a portion of said shaft for bending concomitant with flexing of said shaft and thereby generating a first electric output signal representative of a first handwriting directional component in response to flexure in said shaft in a first direction, a second piezoelectric element fixedly secured to and extending along a portion of said shaft at a location circumferentially spaced from said first element for bending concomitant with flexing of said shaft and thereby generating a second electric output signal representative of a second handwriting directional component in response to flexure in said shaft in a second direction; and means for discretely conducting said first and second generated electric output signals representative of said first and second handwriting directional components, devoid of summing, from said first and second piezoelectric elements to an output device.

4,078,227

THRESHOLD DETECTOR FOR OPTICAL CHARACTER RECOGNITION SYSTEM

William David Fahey, Cupertino, and Paul J. Perez, Sunnyvale, both of Calif., assignors to The Singer Company, Binghamton, N.Y.

Filed Mar. 21, 1977, Ser. No. 779,702
Int. Cl.[2] G06K 9/00
U.S. Cl. 340—146.3 AG 8 Claims



1. A threshold detector for use with a video signal including a first level representative of a white surface, a second level representative of a true black mark on the white surface, and a third level intermediate said first and second levels representative of a false black mark, said threshold detector comprising:

first means responsive to a video signal and operative to clamp such signal so as to provide a restored signal that is a replica of said video signal and having a base level corresponding to said first level, a fourth level corresponding to said second level and a fifth level corresponding to said third level;

second means responsive to said restored signal and operative to provide a peak detected signal having a magnitude that corresponds generally to said fourth level;

third means for reducing the magnitude of said peak detected signal such that the reduced signal exceeds said fifth level;

a comparator device responsive to said restored signal and the reduced peak detected signal and operative to produce a first bistate signal having a normally low level and having a high level when said restored signal exceeds said reduced peak detected signal;

fifth means for generating a sequence of pulses, one of which occurs when said first bistate signal has said high level; and

a flip-flop device having a first input connected to said comparator, a second input connected to said fifth means, and an output, said flip-flop device being responsive to said first bistate signal and said sequence of pulses and operative to provide, at said flip-flop device output, a second bistate signal having a first state and a second state, and having a transition from said first state to said second state when there is time coincidence between said high level and one of said sequence of pulses, and having a transition from said second state to said first state upon the occurrence of a pulse next in time to said one of said pulses, said second state corresponding to the occurrence of a true black mark.

4,078,228

LOOP DATA HIGHWAY COMMUNICATION SYSTEM

Seiichi Miyazaki, Wakou, Japan, assignor to Ohkura Electric Co., Ltd., Tokyo, Japan

Filed Mar. 16, 1976, Ser. No. 667,415
Claims priority, application Japan, Mar. 24, 1975, 50-35205; Jul. 24, 1975, 50-90962; Aug. 25, 1975, 50-102127
Int. Cl.[2] H04Q 11/00
U.S. Cl. 340—147 R 10 Claims

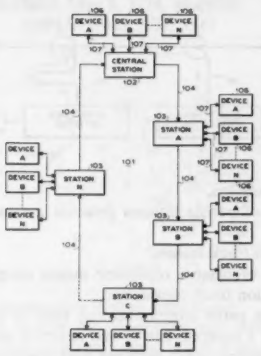
1. A data communication system comprising:

a plurality of data stations including a central data station;

a transmission line connecting said data stations serially in a loop; said data stations including:

means for transmitting time slotted signals unidirectionally over said transmission line from one station to the next successive station; said central data station including:

means for organizing a plurality of generated time slots into an information block wherein said information block



includes a block synchronizing signal, a first frame and a second frame; each of said other data stations including:

means for inserting information into said first frame, means for transmitting said inserted information in said first frame, and means for receiving information contained in said second frame; and said central data station including:

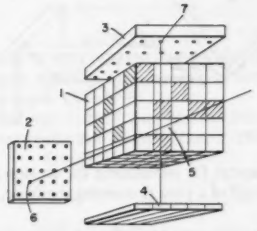
means for retransmitting in the second frame information received in the first frame.

4,078,229

THREE DIMENSIONAL SYSTEMS

Wyn K. Swanson, P.O. Box 4321, Berkeley, Calif. 94704, and Stephen D. Kremer, 5325 Lamlin Ave., Oakland, Calif. 94618

Filed Jan. 27, 1975, Ser. No. 544,480
Int. Cl.[2] G11C 13/02
U.S. Cl. 340—173 CM 15 Claims



1. A medium for forming a substantially persistent three-dimensional sensible object comprising:

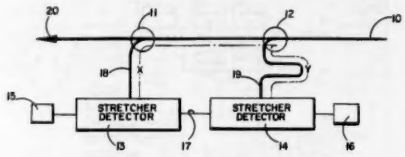
a substantially transparent dispersion fluid capable of maintaining a relatively stable shape containable within a volume; and

a photo-reactant substantially dispersed in said dispersion fluid, a molecule of said photo-reactant being responsive to a first photon of optical radiation emitted in a first selected spectral region to excite an electron to an excited state, said molecule being further responsive to a second photon of optical radiation emitted in a second selected spectral region to generate a mono-molecular chemical reaction at a single reaction site for rapidly forming said sensible object without migration of molecular reactants.

4,078,230
MULTI-SEGMENT DETECTOR

Peter K. George, Placentia, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Feb. 2, 1976, Ser. No. 654,677
Int. Cl.[2] G11C *19/08*
U.S. Cl. 365—8 12 Claims

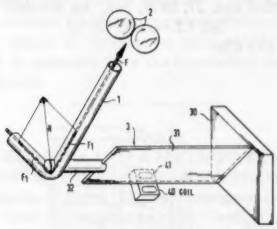


1. In combination,
a plurality of bubble domain detector means connected in series,
propagation track means,
a plurality of passive replicator means coupled with said propagation track means, and
propagation paths interconnecting each of said replicator means to a separate one of said detector means,
said propagation paths between said replicator means and said detector means being of different length.

4,078,231
METHOD AND APPARATUS FOR MONITORING THE FLAWS IN SPUN YARN PRODUCED ON OPEN END ROTOR SPINNING MACHINES

Peter Artzt, Pfullingen; Herbert Bauer, Reutlingen; Gerhard Egbers, Eningen, and Sohrab Tabibi, Pfullingen, all of Germany, assignors to Schubert & Salzer, Ingolstadt, Germany

Filed Jun. 10, 1976, Ser. No. 694,806
Claims priority, application Germany, Jun. 25, 1975, 2528290
Int. Cl.[2] G08B *21/00*
U.S. Cl. 340—259 11 Claims

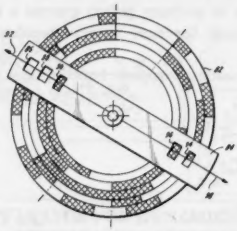


11. An apparatus for monitoring the tension in yarn as said yarn is drawn off of a yarn processing machine, said apparatus comprising:
(a) movable means over which said yarn passes as said yarn is drawn off said yarn processing machine for being deflective responsive to changes in tension in said yarn,
(b) means operably associated with said movable means for generating an electrical signal having an amplitude corresponding to the position of said movable means.,
(c) means for integrating said electrical signal producing an integrated electrical signal corresponding to changes in tension in said yarn over a predetermined period of time,
(d) means receiving said electrical signal and generating an instantaneous signal having a value corresponding to sudden changes in the tension of said yarn, and
(e) a comparator means comparing said integrated electrical signal with said instantaneous signal for generating an out of tolerance signal responsive to sudden changes in the tension in said yarn.

4,078,232
OPTICAL ANALOG TO DIGITAL CONVERTER

Hayati Balkanli, Houston, Tex., assignor to Lynes, Inc., Houston, Tex.

Continuation of Ser. No. 450,819, Mar. 13, 1974. This application Jun. 25, 1976, Ser. No. 699,953
Int. Cl.[2] G08C *9/06*
U.S. Cl. 340—347 P 2 Claims

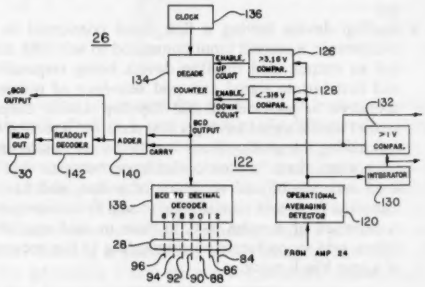


1. A multi-phase binary code wheel comprising: a body made of quartz having a metalized code pattern extending on an arc of at least 320° affixed thereon, said code pattern arranged into a plurality of concentric bands with the outermost band being the least significant bit indication and the innermost band being the most significant bit indication, said concentric bands being divided into a plurality of regions substantially transparent to infra-red energy indicative of one binary condition and a plurality of opaque regions indicative of the other binary condition, said code pattern being arranged into a plurality of multi-phase configurations such that each bit is sensed along its own concentric band and weighted with respect to its origin of pattern on a pe-assigned radius.

4,078,233
ANALOG TO DIGITAL CONVERTER CIRCUIT WITH GAIN RANGING FEEDBACK

George Joseph Frye, 12175 SW. Douglas, Portland, Oreg. 97225

Division of Ser. No. 430,462, Jan. 3, 1974, Pat. No. 3,922,506. This application Aug. 29, 1975, Ser. No. 608,871
Int. Cl.[2] H03K *13/02*
U.S. Cl. 340—347 AD 7 Claims



1. An analog to digital converter circuit comprising:
calibrated AC amplifier means including input circuit means having input signal means applied thereto, gain switching means which can be switched in 10 dB increments and a plurality of output circuit means;
detector means connected to one of said plurality of output circuit means of said calibrated AC amplifier means for providing a fast-varying DC signal;
first comparator means connected to said detector means and providing switching signals according to said fast-

varying DC signal and having an operating range of greater than 10 dB;

first counter means connected to said first comparator means for receiving said switching signals and providing according thereto gain-switching signals to said gain-switching means for incrementally controlling in 10 dB increments the gain of said calibrated AC amplifier means and providing digital output signals therefrom;

integrator circuit means connected to said detector means for smoothing fluctuations of said fast-varying DC signal;

second comparator means connected to said integrator circuit means for providing control signals;

second counter means connected to said second comparator means for receiving said control signals;

feedback means connected between said second counter means and said second comparator means for setting said second counter means at a condition corresponding to the DC level of the output of said integrator circuit means such that the number provided by said second counter means has a logarithmic relation to the smoothed DC signal;

third comparator means for examining the level of said smoothed DC signal and providing correction control signals;

adder circuit means receiving said correction control signals and said digital output signals to provide corrected digital signals; and

readout means receiving said corrected digital signals from adder means for providing most significant digit readout information and also being connected to said second counter means for providing least significant digit readout information.

4,078,234

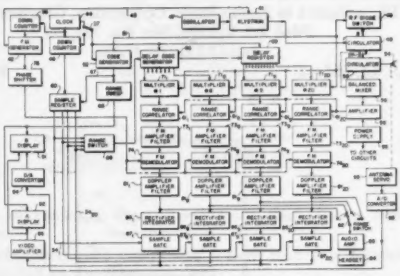
CONTINUOUS WAVE CORRELATION RADAR SYSTEM

William Fishbein, Elberon, and Otto E. Rittenbach, Neptune, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Continuation-in-part of Ser. No. 571,811, April 25, 1975, abandoned. This application May 19, 1976, Ser. No. 687,783

Int. Cl.² G01S *9/23*

U.S. Cl. 343—9 **14 Claims**



1. A radar system comprising:

a signal transmitter source of continuous wave electromagnetic energy of a single frequency;

means for generating a sinusoidal signal for frequency modulating said source;

code means for generating a p-bit pseudo-random binary code; and

means for phase-modulating said frequency modulated source with said pseudo-random code.

4,078,235

OBSTACLE DETECTING SYSTEM

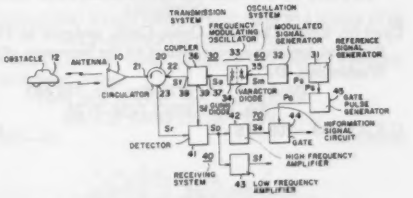
Hiroshi Noda, and Yukiyasu Watanabe, both of Nagaoka Kyoshi, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 486,599, July 8, 1974, abandoned. This application Jun. 3, 1976, Ser. No. 692,348

Claims priority, application Japan, Jul. 10, 1973, 48-77698; Mar. 6, 1974, 49-25898; May 3, 1974, 49-49585

Int. Cl.² G01S *9/37, 9/44*

U.S. Cl. 343—9 **11 Claims**



1. An obstacle detecting system comprising:

an oscillating device for generating and directing to an obstacle a first oscillating signal in a first time period and a second oscillating signal having a different frequency than that of the first oscillating signal in a second time period;

a detector for mixing the signals received by the antenna and the output of the oscillating device to generate a detected signal which comprises a first signal component derived by mixing the first oscillating signal reflected by the obstacle and received by the antenna with the second oscillating signal generated by the oscillating device and a second signal component derived by mixing the second oscillating signal reflected by the obstacle and received by the antenna with the second oscillating signal generated by the oscillating device; and

an information signal circuit for receiving the detected signal and generating distance information relating to the distance between the antenna and the obstacle by processing the first signal component in the detected signal and relative velocity information relating to the relative velocity of the antenna and the obstacle by processing the second signal component in the detected signal.

4,078,236

REMOTE SWITCHING APPARATUS

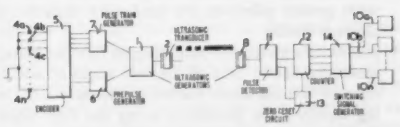
Leo Bruce Hempell, Almonte, Canada, assignor to Quality Technology Ltd., Ottawa, Canada

Filed Apr. 7, 1975, Ser. No. 565,387

Claims priority, application Canada, Oct. 2, 1974, 210606

Int. Cl.² H04B *7/00*

U.S. Cl. 343—228 **19 Claims**



1. Remote switching apparatus comprising:

(a) a multiplicity of selection switches,

(b) encoding means connected to said switches for providing a numerical output upon the sequential actuation of any two of said switches,

(c) means responsive to the actuation of the first of said switches for the generation of prepulse signal,

(d) means responsive to the following actuation of another of said switches, for translating the numerical output result-

ing from the actuation of both said switches for generating a pulsing signal corresponding to said numerical output, and

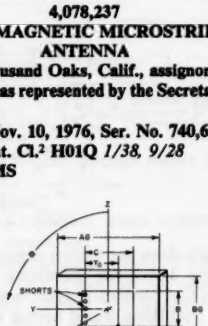
(e) means for transmitting said prepulse signal followed by said pulsing signal.

4,078,237

OFFSET FED MAGNETIC MICROSTRIP DIPOLE ANTENNA

Cyril M. Kaloi, Thousand Oaks, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Nov. 10, 1976, Ser. No. 740,693
Int. Cl.² H01Q 1/38, 9/28
U.S. Cl. 343—700 MS **10 Claims**



1. An offset fed magnetic microstrip dipole antenna having low physical profile and conformal arraying capability, comprising:

a. a thin ground plane conductor;

b. a thin substantially rectangular radiating element spaced from said ground plane;

c. said radiating element being electrically separated from said ground plane by a dielectric substrate;

d. said radiating element being shorted to the ground plane at one end of the length thereof;

e. said radiating element having a feed point located along an edge of the length thereof;

f. the length and width of said radiating element and the spacing between the radiating element and the ground plane all being factors determining the resonant frequency of said antenna;

g. the antenna input impedance being variable to match most practical impedances as said feed point is moved along said edge of the length of said radiating element without affecting the antenna radiation pattern;

h. the antenna bandwidth being variable with the width of the radiating element and the spacing between said radiating element and said ground plane, and spacing between the radiating element and the ground plane having somewhat greater effect on the bandwidth than the radiating element width;

i. said radiating element oscillating in five oscillating dipole moments, one at each of the four edges of said radiating element and one above the broadside surface of the radiating element, the oscillation along the four edges of the radiating element occurring between the radiating element and the ground plane and the oscillation above the broadside surface of the radiating element occurring along the length of the radiating element, there being only one current oscillation of the cavity between the radiating element and ground plane and said current oscillation mode contributes to the five oscillating dipole moments;

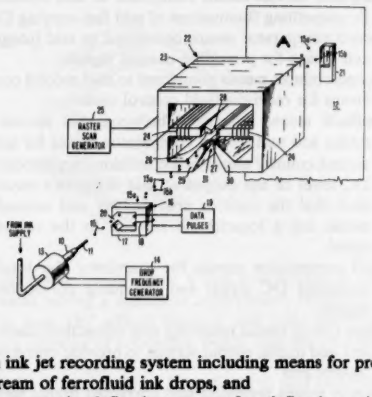
j. optimum match for the resonant mode of oscillation being obtained by varying the location of said feed point along the radiating element edge.

4,078,238

MAGNETIC DEFLECTOR FOR A MAGNETIC INK JET PRINTER

Ho Chong Lee, Endicott, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 26, 1976, Ser. No. 745,026
Int. Cl.² G01D 15/18
U.S. Cl. 346—75 **12 Claims**



1. An ink jet recording system including means for producing a stream of ferrofluid ink drops, and

electromagnetic deflection means for deflecting said ink drops in a direction transverse to the direction of travel of said stream of ink drops

said electromagnetic deflection means including a first magnetic means defining an axial air gap extending along a plural drop segment of said stream,

said gap being shaped to produce a non-uniform gradient magnetic field in the region external to said air gap for the vertical deflection of said ink drops,

said electromagnetic deflection means including second magnetic means in said region,

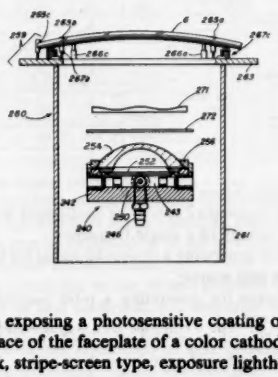
said second magnetic means being operable to counterbalance horizontal centering forces affecting ink drops moving off center through said magnetic field.

4,078,239

METHOD AND APPARATUS FOR SCREENING SLOT-MASK, STRIPE SCREEN COLOR CATHODE RAY TUBES

Charles J. Prazak, Elmhurst, and Yong S. Park, Roselle, both of Ill., assignors to Zenith Radio Corporation, Glenview, Ill.

Filed Jul. 2, 1976, Ser. No. 701,773
Int. Cl.² G03B 41/00
U.S. Cl. 354—1 **8 Claims**



6. For use in exposing a photosensitive coating on the concave inner surface of the faceplate of a color cathode ray tube of the slot mask, stripe-screen type, exposure lighthouse appa-

ratus for forming screen stripes having improved width uniformity and edge definition, comprising:

means for supporting a curved, approximately rectangular faceplate which has on its concave inner surface a photosensitive coating and which has supported adjacent its inner surface an exposure mask defining an array of columns of spaced slots oriented parallel to the minor axis of the faceplate;

a line source of radiation actinic to said coating and means for supporting said source on or near a central axis of the faceplate, at a predetermined distance from the concave inner surface of said faceplate, and with the line of the source oriented parallel to the minor axis of the faceplate, said line source being thus substantially parallel to mask slots at the center of the mask but nonparallel to slots in other parts of the mask, the said source-slot nonparallelism and faceplate curvature representing a condition effective to produce an unwanted rotational displacement of individual mask slot images projected on the faceplate inner surface in regions of the inner surface lying off the major and minor axes of the faceplate, which unwanted rotational displacement of projected slot images would in turn result in stripe width nonuniformity and degraded stripe edge definition in the said regions of the faceplate; and

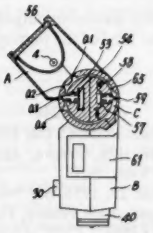
a negative meniscus lens having a convex outer surface of radius R_2 and a concave inner surface of radius R_1 which is smaller than the lens front-to-base thickness and smaller than R_2, said lens being positioned between said source and the center of the faceplate with its concave surface facing said source and at a predetermined distance away from said source so as to produce a virtual image of the line source which appears, when viewed from off-axis points on the faceplate, to be rotated in a direction effective to decrease said unwanted rotational displacement of the mask slot images and thus to improve stripe width uniformity and edge definition.

4,078,240

PHOTOGRAPHIC FLASH DEVICE

Yoshikazu Kaneko, Shijonawate, and Hisashi Ogura, Ikoma, both of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Aug. 2, 1976, Ser. No. 710,927
Claims priority, application Japan, Aug. 19, 1975, 50-100853
Int. Cl.² G03B *7/16, 15/02;* H05B *41/14*
U.S. Cl. 354—33 **5 Claims**



1. In an automatic type photoelectric flash device which includes:

a strobo flash tube retained in a flash tube part rotatably installed on a main part,

a capacitor connected to said flash tube, said capacitor being adapted to store electrical energy and to supply current for flashing said tube,

a battery for charging said capacitor,

a flash-terminating circuit operatively associated with said flash tube, and

an electric circuit joined to said flash-terminating circuit for controlling same, said circuit comprising light-receiving means for producing an output in response to light reflected from the direction of a photographic object and switching means responsive to said output reaching a preset level for producing a flash-terminating signal which is applied to the flash-terminating circuit, the improvement comprising:

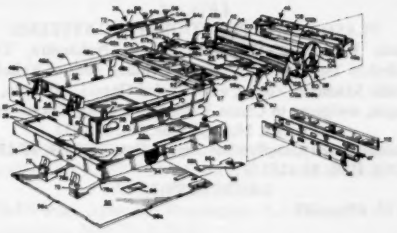
additional switch means operatively related to said flash tube part and to said electric circuit, said additional switch means actuated in response to the position of said tube part relative to the main part for altering a circuit constant of said electric circuit thereby changing the time required for said electric circuit to produce a flash-terminating signal.

4,078,241

FILM-ENGAGING PHOTOGRAPHIC MECHANISM FOR SELF-DEVELOPING FILM

Richard Paglia, Carlisle, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Sep. 9, 1976, Ser. No. 721,855
Int. Cl.² G03B *15/52, 17/26*
U.S. Cl. 354—86 **16 Claims**



1. Apparatus for engaging self-developing photographic film, in the form of cassette-housed separate card-like film units, in a camera; said apparatus receiving a replaceable film cassette and positioning it with a foremost film unit therein located for photographic exposure, and advancing the foremost film unit from the cassette for processing with fluidic photoprocessing composition carried with the film unit, said apparatus having

i. a receptacle for replaceably receiving at a front end thereof a cassette containing such card-like film units stacked under an exposure window, said cassette having a frontal exit slot and an access opening thorugh which the foremost film unit can be engaged for advancing it through the exit slot for discharge from the cassette, and

ii. a processor of self-developing film units, said processor being hingedly mounted to the receptacle adjacent the front thereof for hinging movement between a first position where the processor is at the front of the receptacle in alignment to receive a film unit being advanced out of a receptacle-seated cassette, and a second position where the processor is removed clear of the path of a cassette being loaded into and alternatively being removed from the receptacle,

said apparatus being characterized in that said receptacle and said processor constitute a complete mechanism adapted for mounting as a unit in a camera for receiving and selectively positioning such a film cassette, and for engaging such self-developing film units within the cassette and for processing such film units, and further imposing minimal requirements and restraints on non-film engaging elements of the camera, and comprising

A. a unitary receptacle structure having a laterally-extending top wall and laterally-extending first and second side walls and transversely-extending back wall means, said side walls and back wall means being arranged to positioningly engage side and back walls of such a film cassette received in the receptacle and said top wall having an aperture located to be in register with the exposure window of such a cassette,

B. an opening in at least one laterally-extending wall of said receptacle,

C. a carriage movably mounted on the outside of the receptacle and having means for driving engagement therewith,

D. pick arm means mountingly secured to said carriage and extending through said opening to within said receptacle for engagement with the back edge of a foremost film unit in a receptacle-seated cassette, and movable with said carriage for advancing such a film unit frontward and out of the cassette exit slot,

E. means forming a plate member spanning between said receptacle side walls and overlying a receptacle-seated cassette above and closely adjacent the exit slot thereof, said plate member including structural elements for resisting deflection outward from within said receptacle, and

F. means for hingedly mounting said processor to said receptacle adjacent the front thereof with hinge action which alternatively disposes the processor in said first position and in said second position.

4,078,242
FLASH LIGHT PHOTOGRAPHIC SYSTEMS

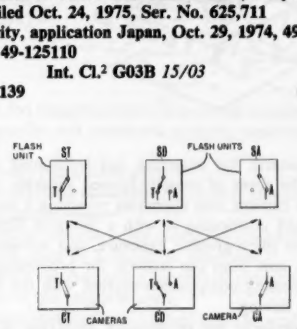
Takashi Uchiyama, Yokohama; Zenzo Nakamura, Urawa; Tokuichi Tsunekawa; Masanori Uchidoi, both of Yokohama; Yukio Mashimo, Tokyo, and Shyohei Ohtaki, Machida, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 24, 1975, Ser. No. 625,711

Claims priority, application Japan, Oct. 29, 1974, 49-124612; Oct. 30, 1974, 49-125110

Int. Cl.² G03B *15/03*

U.S. Cl. 354—139 **6 Claims**



1. A flash unit usable with either of a first camera whose control to diaphragm aperture is controlled for flash photography by a signal corresponding to the amount of light from an output terminal of the flash unit during flash photography, and with a second camera which controls the amount of light emitted by the flash unit by applying a signal corresponding to a preset diaphragm aperture value into the flash unit, said flash unit comprising:

(a) flash means to generate a flash of light,

(b) control signal forming circuit to form a control signal corresponding at least to the amount of light from the flash unit,

(c) a light emission control circuit coupled to the flash means for detecting a signal corresponding to the diaphragm aperture value preset into the second camera to control the amount of light emitted by the flash means on the basis of the signal,

(d) an external terminal to carry the control signal of said control signal forming circuit and to apply a signal corresponding to the preset diaphragm aperture value, and

(e) a connection circuit for alternately connecting said external terminal with said control signal forming circuits or with said light emission control circuit so that when the external terminal and the control signal forming circuit are connected by the connection circuit a control signal corresponding to at least the amount of light emitted is produced from the external terminal so as to allow flash photography, and so that when the external terminal and light emission amount control circuit are connected a signal corresponding to the diaphragm aperture value set by the second camera is applied to the flash unit, thereby allowing flash photography by the second camera.

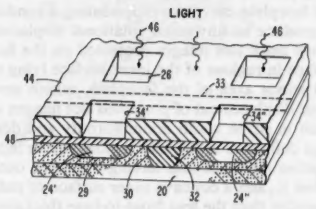
4,078,243
PHOTOTRANSISTOR ARRAY HAVING UNIFORM CURRENT RESPONSE AND METHOD OF MANUFACTURE

David E. De Bar, Manassas, and Francisco H. De La Moneda, Reston, both of Va., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 12, 1975, Ser. No. 640,376

Int. Cl.² H01L *27/14*

U.S. Cl. 357—32 **6 Claims**



1. A light sensing array having uniform current response comprising:

a. a semiconductor substrate including a plurality of active phototransistors;

b. a metallization layer interconnecting the phototransistors,

c. an opaque polymer layer, developable by exposure to an electron beam, adhered to the semiconductor and covering the active phototransistors and metallization layer to control effective base areas of the phototransistors,

d. openings of predetermined different sizes in the opaque layer over the active phototransistors to achieve identical current response from each phototransistor when exposed to uniform light flux,

e. the size of an opening over each phototransistor is given by the relation $(I_m/I_x)^{1-n}$ where I_m is the minimum collector current measured for the array; I_x is the collector current for the phototransistor beneath the opening and n is a constant definitive of the change in beta of a phototransistor in the array over a given range of collector currents, and

f. the array obtaining maximum output current by utilization of maximum base area of the phototransistor having minimum beta.

4,078,244
SEMICONDUCTOR DEVICE

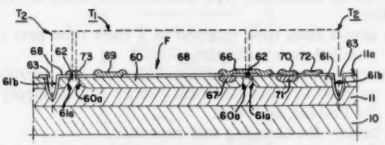
Maurice Bonis, Herouville, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 23, 1976, Ser. No. 660,499

Claims priority, application France, Feb. 28, 1975, 75 06360

Int. Cl.² H01L *27/02, 27/04, 29/06*

U.S. Cl. 357—46 **8 Claims**



1. A semiconductor device having at least two transistors comprising:

(a) a semiconductor body containing said transistors,

(b) said transistors comprising respective emitter and base

zones, said emitter zones being of a first conductivity type and said base zones being of a second conductivity type, said transistors further comprising a common collector zone of said first conductivity type, said base zones of said transistors being provided in said common collector zone and comprising oppositely located edges, said base zones forming respective junctions with said collector zone and being separated over at least a part of their oppositely located edges by a strip-shaped region of semiconductor material that is of said first conductivity type and that has a width adapted such that in the operating condition of said transistors the depletion zones of the respective base-collector junctions of said transistors merge into each other,

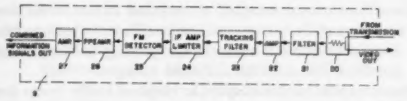
(c) a groove located in said semiconductor body and bounded by a wall that bounds said base zones at their respective parts located beyond said strip-shaped region and throughout the remaining part of their edges, said groove having a greater depth than said base-collector junctions.

4,078,245

SYSTEM FOR MULTIPLEXING INFORMATION CHANNELS ADJACENT TO A VIDEO SPECTRUM

J. Walter Johnson, Walnut Creek, and Herbert H. Borchers, Pleasant Hill, both of Calif., assignors to Coastcom, Inc., Concord, Calif.

Division of Ser. No. 369,481, Jun. 13, 1973, Pat. No. 3,917,906.
This application Nov. 3, 1975, Ser. No. 628,235
The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.
Int. Cl.[2] H04N *7/10, 7/08;* H04B *1/06*
U.S. Cl. 358—86 **3 Claims**



1. A method for recovering an information signal multiplexed with a video spectrum that includes sync pulses with the information signal being frequency modulated on a subcarrier having a center frequency and multiplexed with said video spectrum at a level at least 20 db below the peak level of said video spectrum so that the intermodulation products of the information signal and multiple harmonics of said sync pulses are at a level at least 45 db below said video spectrum, said method comprising the steps of:

filtering the frequency modulated subcarrier and video spectrum to separate one from the other;

synthesizing substantially only the frequency modulated subcarrier by tracking a portion of said modulated subcarrier adjacent to and including said center frequency of said subcarrier, said portion tracked including less than the full deviation of said modulated subcarrier to exclude said intermodulation products; and

demodulating the synthesized modulated subcarrier.

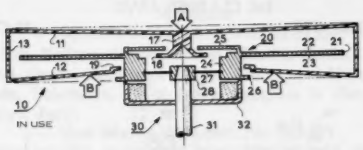
4,078,246

HOLDER FOR MAGNETIC DISCS

Jean Louis Berthoux, Paris, and Albert Langrenne, La Courneuve, both of France, assignors to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 30, 1976, Ser. No. 755,793
Claims priority, application France, Dec. 31, 1975, 75 40359
Int. Cl.[2] G11B *23/04, 25/04*
U.S. Cl. 360—133 **11 Claims**

8. A container for a magnetic recording disc for use in connection with read and/or write heads of an apparatus comprising a cassette having first and second opposed, rigid, elastically deformable walls extending generally parallel to faces of the disc, and hub means for rotatably driving the disc through the first wall from a shaft of the apparatus and for enabling the walls to be deflected inwardly toward each other and the disc



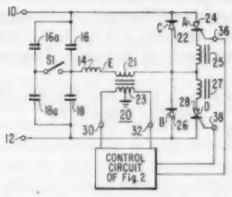
by force exerting means of the apparatus while the disc is being driven by the shaft and for maintaining the opposed walls in a rigid parallel relationship while the disc is not being driven by the shaft.

4,078,247

INVERTER CIRCUIT CONTROL CIRCUIT FOR PRECLUDING SIMULTANEOUS CONDUCTION OF THYRISTORS

George Werner Albrecht, Flemington, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,127
Int. Cl.[2] H02M *7/515*
U.S. Cl. 363—96 **25 Claims**



1. In a circuit for supplying an alternating current to a load which includes two power supply terminals and first and second gate-controlled thyristor switches, each said switch having a gate electrode, a main conduction path and an associated turn-off time, the main conduction paths of said switches being connected in series between said terminals with each path having a commutating diode in inverse-parallel connection therewith, an improved control network for applying complementary signals to the gate electrodes of said switches to preclude their simultaneous conduction, said control network comprising:

means in series with said load for sensing the current through said load;

means responsive to said current sensing means for producing a trigger pulse at each zero crossing of said current;

means responsive to each trigger pulse for producing a delay signal having a duration at least as great as the turn off time of said switches;

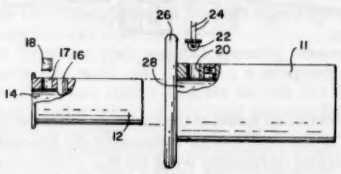
first means responsive to the cessation of each alternate one of said delay signals for producing a first signal at the gate electrode of said first switch to render it conductive; and

second means responsive to the cessation of each of the remaining alternate delay signals for producing a second signal at the gate electrode of said second switch to render it conductive.

4,078,248
LOCK LIGHT

Daniel Hill, P.O. Box 185, Bloomington, Ind. 47401

Filed Sep. 8, 1976, Ser. No. 721,338
Int. Cl.[2] E05B 17/10
U.S. Cl. 362—100 10 Claims

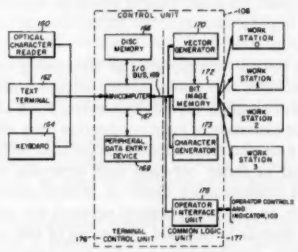


1. In a conventional cylinder type lock provided with a keyhole having a cylinder unit, a cylinder tumbler and tumbler pins in holes; the improvement comprising a minature light emitting means inserted entirely into a pin hole in the cylinder unit and a solid light transmitting tumbler pin inserted into a said pin hole in the tumbler unit through which the light shines into the keyhole thereby illuminating it.

4,078,249
DIGITAL DISPLAY COMPOSITION SYSTEM

Helmut Lelke, Southboro; Richard A. Howard, Gleasondale; John A. Forte, Jr., Hyannis, and Jay G. Levinthal, Lexington, all of Mass., assignors to Raytheon Company, Lexington, Mass.

Filed Jun. 1, 1976, Ser. No. 691,750
Int. Cl.[2] G06F 3/14
U.S. Cl. 364—200 43 Claims



1. In combination:

a plurality of visual display means;

memory means, said memory means having at least one storage location for each elemental display position upon each of said visual display means, video signals for operating said display means being produced by reading data out of said memory means to said display means;

a single means for producing digital signals representing line patterns;

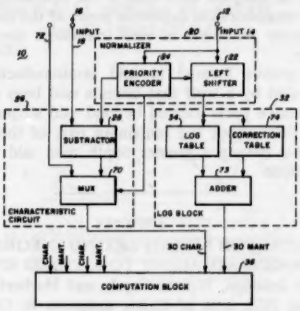
a single means for producing digital signals representing symbol patterns; and

said digital signals representing said line patterns and said digital signals representing said symbol patterns being coupled to data inputs of said memory means.

4,078,250
LOG-ANTILOG CONVERSION FOR A DIGITAL RADAR SYSTEM

David F. Windsor, and Kanwalnain S. Rekhi, both of Sunnyvale, Calif., assignors to The Singer Company, Binghamton, N.Y.

Continuation of Ser. No. 499,262, Aug. 21, 1974, abandoned. This application Jun. 4, 1976, Ser. No. 692,816
Int. Cl.[2] G06F 5/00, 7/38
U.S. Cl. 364—715 6 Claims



1. A log-antilog conversion circuit adapted for use in a digital radar landmass system to expediate computations by converting linear domain numbers from the digital radar landmass system into log domain numbers prior to computation by the digital radar landmass system and then converting the log domain numbers into linear domain numbers subsequent to computation, comprising:

normalizer means adapted to respond to the linear domain numbers prior to computation to eliminate leading zeros in the linear domain numbers for putting the linear domain numbers into uniform mantissa form;

characteristic means adapted to respond to the linear domain numbers prior to computation for calculating the log domain characteristic of the linear domain numbers;

log means responsive to the linear domain mantissa for determining the approximate log thereof by providing

$\text{Log}(M) \simeq \text{Log}(m) + 2n/2m' + n$

where M = the mantissa = $m + n$

$m >> n$

m = the MSB portion of M,

n = the LSB portion of M, and

m' = the MSB portion of m;

antilog means responsive to the log domain numbers subsequent to computation for determining the antilog of the log domain mantissa of the log domain number; and

binary point means responsive to the log domain numbers subsequent to computation for determining the linear domain binary point of the received logs.

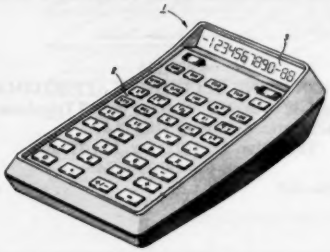
4,078,251
ELECTRONIC CALCULATOR OR MICROPROCESSOR WITH MASK LOGIC EFFECTIVE DURING DATA EXCHANGE OPERATION

Stephen P. Hamilton, Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 27, 1976, Ser. No. 736,272
Int. Cl.[2] G06F 15/02, 15/20
U.S. Cl. 364—700 6 Claims

1. An electronic calculator system having input means for receiving numeric data and function commands, an arithmetic unit for performing arithmetic operations on numeric data received by said input means, an address register responsive to said input means, an instruction word memory for storing a number of instruction words and addressable in response to an address stored in said address register, instruction word de-

coder means for decoding instruction words outputted from said instruction word memory and for controlling said arithmetic unit in response thereto, a plurality of operational registers for storing numeric data, a plurality of operational register selector gates coupling said operational registers with said arithmetic unit, and mask logic means, included in said instruction word decoder means, for generating mask signals to said plurality of operational register selector gates, said plurality of

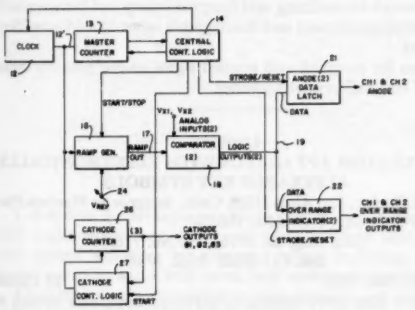


operational register selector gates being both responsive to said instruction word decoder means for determining which operational registers are coupled to said arithmetic unit during arithmetic operations and coupled to each other during data exchange operations and responsive to said mask logic means for transferring selected portions of the data words stored in the operational registers being controlled by said instruction word decoder means during arithmtic and data exchange operations.

4,078,252
RAMP GENERATOR

Simon L. Schoenfeld, and Eugene C. Coussens, both of San Jose, Calif., assignors to Signetics Corporation, Sunnyvale, Calif.

Continuation of Ser. No. 602,570, Aug. 7, 1975, abandoned. This application Jan. 10, 1977, Ser. No. 757,767
Int. Cl.² G06F *15/34*; H03K *1/14*
U.S. Cl. 364—858 **4 Claims**

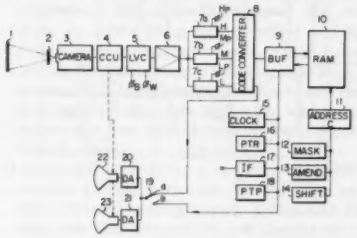


1. A ramp generator system providing an output proportional to an analog signal input comprising a clock having a predetermined frequency, a constant current source having an ouput signal turned on and off by said clock, said source including means for adjusting the magnitude of said output signal, an integrating capacitor connected to said current source and integrating said output signal to produce a voltage ramp, sample and hold means for sampling and holding said voltage ramp at a time determined by a predetermined clock count and for comparing said held voltage amplitude with a reference voltage input amplitude to produce an error signal defined by the difference in the respective amplitudes, said adjusting means being coupled to said sample and hold means and responsive to said error signal for changing said magnitude of said current source output signal to minimize said error signal, and means responsive to said predetermined count for discharging said capacitor.

4,078,253
PATTERN GENERATING SYSTEM

Toshihiro Kajiura, Osaka; Chiaki Masaki, Settsu; Masahiro Mori, Osaka; Toshibumi Sakata, Tokyo, and Haruhisa Shimoda, Yokohama, all of Japan, assignors to Kanebo Ltd., Tokyo, Japan

Filed Mar. 4, 1975, Ser. No. 555,197
Claims priority, application Japan, Mar. 4, 1974, 24140/74
Int. Cl.² D04B *15/84*
U.S. Cl. 364—900 **10 Claims**



1. A pattern generating system for providing pattern information to produce a Jacquard pattern for a knitting or weaving machine comprising

a television camera for converting the pattern of an objective being analyzed to analog signals, said television camera scanning individual lines and having a flyback time between lines,

a plurality of comparators for dividing said analog signals into a plurality of partial signals in accordance with the amplitude of said analog signals,

a code converter connected to said comparators for converting each of said partial signals into digital signals,

digital memory means for storing said digital signals,

output means for providing pattern information to the knitting or weaving machine in accordance with the digital signals stored by said digital memory means,

said digital memory means including a buffer register and a memory unit, said buffer register being connected to said code converter for storing in said buffer register digital signals corresponding to one scanned line as each line is being scanned by said television camera, and means for transferring said one scanned line digital signals from said buffer register to said memory unit during a flyback time.

4,078,254
HIERARCHICAL MEMORY WITH DEDICATED HIGH SPEED BUFFERS

William F. Beausoleil, Hopewell Junction, and Byron E. Phelps, Poughkeepsie, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 174,831, Aug. 25, 1971, abandoned. This application Dec. 26, 1973, Ser. No. 427,889
Int. Cl.² G06F *13/00*
U.S. Cl. 364—900 **10 Claims**

1. For use with a data processing system, a hierarchical memory comprising:

a backing store having data units stored therein at memory addresses;

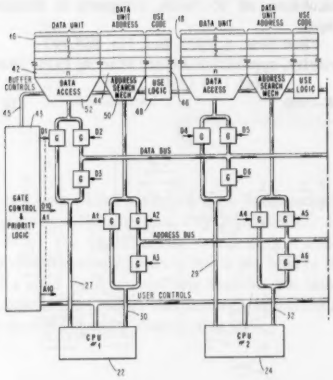
a first buffer dedicated to a first user of said hierarchical memory;

a second buffer dedicated to a second user of said hierarchical memory;

bus/gating means interconnecting said first user, said second

user, said first buffer, said second buffer, and said backing store;

means responsive to a request for a data unit from said first user for searching said first buffer for said data unit and for controlling said bus/gating means to thereby transfer said data unit between said first buffer and said first user upon the condition that said data unit resides in said first buffer, and



means for searching said second buffer for said data unit upon the condition that said requested data unit is not found in said first buffer and for controlling said bus/gating means to thereby transfer said data unit between said second buffer and said first user upon the condition that said data unit resides in said second buffer.

4,078,255

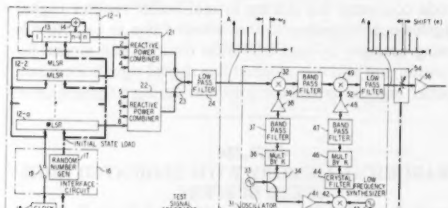
SEQUENCE GENERATOR HAVING AMPLITUDES AND PHASES OF SPECTRAL COMPONENTS RANDOMLY DISTRIBUTED

James Gifford Evans, Colts Neck, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Division of Ser. No. 700,537, Jun. 28, 1976. This application Jan. 6, 1977, Ser. No. 757,372

Int. Cl.² G06F *1/02*

U.S. Cl. 364—717 **7 Claims**



1. A signal source comprising: a plurality of generators, each comprising a multistage shift register including feedback means for coupling the content of at least two stages back to an earlier stage to provide a predetermined pseudorandum sequence of characters common to all of the generators,

presetting means comprising a random number generator providing signal sequences indicative of a random-like sequence of numbers, each number including a plurality of characters corresponding to the number of stages in the shift registers,

means for applying the signal sequences to the plurality of shift registers to provide different initial phase setting for each of the plurality of generators,

clocking means connected to each of the generators for gating each of the generators through its sequence and maintaining their respective phase settings relative to each other,

means for combining connected to receive the sequence provided by each of the plurality of generators to produce a single multilevel signal, and

filtering means connected to receive the single multilever signal for lowpass filtering same to provide a pseudo-Gaussian noise output signal occupying a broad bandwidth.

4,078,256

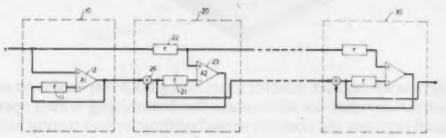
INVERSION USING SUCCESSIVE APPROXIMATION

Harold Seidel, Warren, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Mar. 15, 1977, Ser. No. 777,636

Int. Cl.² G06G *7/26*

U.S. Cl. 364—851 **4 Claims**



4. Apparatus for developing the inverse of a function operating on an applied signal including an approximation block and a cascade interconnection of improvement blocks, with the first improvement block being responsive to the output signal of said approximation block and each succeeding improvement block being responsive to the output signal of the respectively preceding improvement block, each improvement block comprising:

a summing element responsive to an error compensating signal and to the input signal to which said improvement block is responsive, for developing an output signal of said improvement block;

an amplifier for developing said error compensating signal;

a network for realizing said function interposed between said summing element and the negative input of said amplifier; and

means for coupling said applied signal to the positive input of said differential amplifier.

4,078,257

CALCULATOR APPARATUS WITH ELECTRONICALLY ALTERABLE KEY SYMBOLS

Alan S. Bagley, Los Altos Hills, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 23, 1976, Ser. No. 716,867

Int. Cl.² G06F *3/02, 7/38*

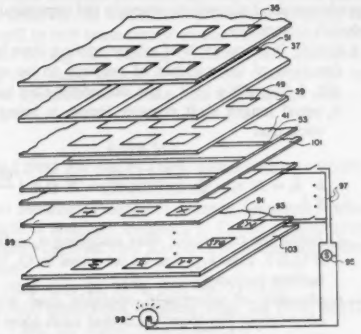
U.S. Cl. 364—900 **19 Claims**

1. In a data entry system, a keyboard apparatus having at least one keyboard configuration of alphanumeric symbols disposed as energizeable elements on at least one plane, said apparatus comprising:

keyboard selection means having a keyboard with at least one labeled key and a plurality of transparent regions with unlabeled keys, said selection means including mode control means responsive to actuation of at least one of the labeled keys for selecting a first and a second mode of operation, and for selecting a keyboard configuration during said first mode, said keyboard selection means including means for selecting one of said planes; and

keyboard display means having at least one plane of energizeable elements disposed beneath the keyboard, and coupled to said keyboard selection means for electronically labeling the unlabeled keys during said first mode by energizing selected portions of selected ones of the ener-

gizeable elements on a selected plane, in accordance with the selected keyboard configuration and displaying the selected keyboard configuration of alphanumeric symbols



through the transparent regions, the electronically labeled keys and selected ones of the labeled keys being actuatable during said second mode for entering information indicated by their labels.

4,078,258

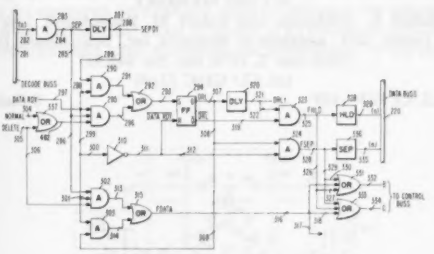
SYSTEM FOR ARRANGING AND SHARING SHIFT REGISTER MEMORY

Royce Darwin Lindsey, and Larry Gene Smith, both of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation-in-part of Ser. No. 214,370, Dec. 30, 1971, abandoned. This application Apr. 22, 1974, Ser. No. 463,029

Int. Cl.[2] **G06F** *13/00;* **G11B** *27/02*

U.S. Cl. 364—900 **7 Claims**



1. A system for arranging codes in a recirculating electronic shift register memory, and performing multiple operations, said system including input/output means including a keyboard, a printer and a bulk store, said system comprising:

A) writing means connected to said memory and including

a) a buss along which said codes are applied to and from said keyboard, said printer and said bulk store,

b) register and gating means for inserting and writing data and control codes into, deleting data and control codes from, and reading data and control codes out of, said memory, and

c) a plurality of control lines along which logical signals are applied when said codes are to be gated through said gating means;

B) decode means connected to said memory for decoding control codes in said memory upon each revolution thereof in said memory; and

C) control means including logical circuitry connected to said decode means and said control lines of said writing means for causing said writing means via signals transmitted over said control lines to initially randomly write a first control code into said memory for defining an input zone and a revision zone in said memory,

said control means further including means for applying logical signals to said control lines dependent upon said decoding of said control codes by said decode means and dependent upon the particular operation to be performed;

said control means further including:

1) means for performing an input operation wherein a number of data codes and a new first control code are written, by said writing means, into said input zone and over at least said first control code in said memory after said first control code has been decoded by said decode means; wherein said zones are redefined through writing said new first control code into said memory following the last of said data codes written into said memory;

2) means for performing a revision operation wherein a number of data codes are inserted into said revision zone, by said writing means, before said first control code has been decoded by said decode means;

3) means for performing a revision operation wherein a number of data codes are written into said revision zone and over existing data codes, by said writing means, before said first control code has been decoded by said decode means;

4) means for performing a revision operation wherein a number of data codes are deleted from said revision zone, by said writing means, before said first control code has been decoded by said decode means; and

5) means for performing an output operation wherein a number of data codes are read out of said revision zone by said writing means before said first control code has been decoded by said decode means; said control means further including means for performing at least two of said input, output and revision operations during a revolution of said first control code in said memory.

4,078,259

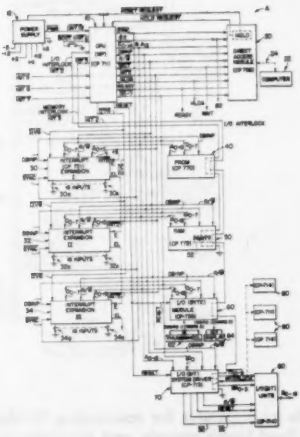
PROGRAMMABLE CONTROLLER HAVING A SYSTEM FOR MONITORING THE LOGIC CONDITIONS AT EXTERNAL LOCATIONS

Donald R. Soulsby, Davenport, and William H. Seipp, Bettendorf, both of Iowa, assignors to Gulf & Western Industries, Inc., New York, N.Y.

Filed Sep. 29, 1976, Ser. No. 727,957

Int. Cl.[2] **G05B** *11/01, 19/02;* **G06F** *9/06*

U.S. Cl. 364—900 **18 Claims**



1. A system for monitoring the logic condition at external addressable locations with known address codes in a programmable controller of the type including a central processing

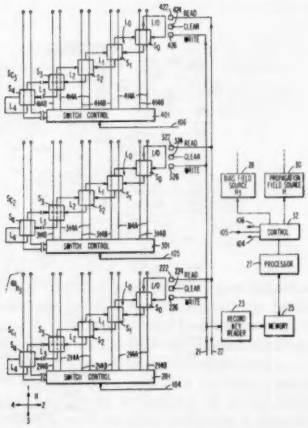
unit, primary address lines connected to the central processing unit, at least one bi-directional data line connected to the central processing unit, a WRITE line connected to the central processing unit for receiving a programmed WRITE signal from said central processing unit and a READ line connected to said central processing unit for receiving a programmed READ signal from said central processing unit, said system comprising: an intermediate output memory unit having a memory location for each external location; an intermediate input memory unit having a memory location for each external location; means for writing data from said line into one of said memory locations of each of said memory units upon creation of a selected one of said known address codes on said primary address lines and a programmed WRITE signal; means for reading data from a memory location in said input memory unit upon creation of a selected one of said known address codes on said primary address lines and a programmed READ signal; sequence counter means for creating said known address codes in sequence on a set of auxiliary address lines, said auxiliary lines being independent of said primary address lines; means for creating a hardwired WRITE signal independent of said programmed WRITE signal and concurrent with a creation of one of said known address codes in said auxiliary address lines; means for creating a hardwired READ signal independent of said programmed READ signal and concurrent with creation of one of said known address codes in said auxiliary address lines; means responsive to one of said hardwired signals for directing data from said output memory unit to the one of said external locations addressed by said one of said created address codes in said auxiliary lines; and means responsive to the other of said hardwired signals for directing data corresponding to the logic condition of a selected one of said external locations from said selected location to said input memory unit for reading and writing to and from said central processing unit.

4,078,260

APPARATUS FOR TRANSPOSITION SORTING OF EQUAL LENGTH RECORDS IN OVERLAP RELATION WITH RECORD LOADING AND EXTRACTION

Tien Chi Chen; Kapali P. Eswaran, both of San Jose; Vincent Yu-Sun Lum, Monte Sereno, and Chin Tung, Saratoga, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 12, 1976, Ser. No. 685,859
Int. Cl.² G06F *7/36, 13/00;* G11C *11/02*
U.S. Cl. 364—900 **5 Claims**



1. In an apparatus for rearranging N identifiable $2m$ bit equal fixed length records, said apparatus including an externally controllable permutation network; and information handling means adapted to respond to the records in the order of their arrival for loading the records into the network, for developing and applying control signals to the network so as to effectuate the physical rearrangement of the records, and for unloading the records from the network, the control signals being derived from comparisons of record indicia according to a predetermined algorithm; wherein the improved permutation network comprises:

q sorting ladders, each of whose sorting time being a linear function of the number of records to be sorted, where $q \geqq 1+\log_3(N+1)/4$, the ith ladder $i \leqq q$ includes:

n_i equal length shift register loops, n_i being constrained such that

$$\sum_{i=1}^{q} n_i = N,\ n_i = Q_{i-1} - Q_i,\ Q_o = N,\ Q_i \geqq \left[\frac{Q_{i-1}}{3}\right],$$

Q_i being the remainder after assigning n_i to the ith ladder, if $Q_i \leqq 3$, then n_{i+1} can be set equal to Q_i, the ith ladder further includes:

a plurality of selectively operable dual mode switches connecting the loops such that each loop has no more than two adjacent switchable neighboring loops, and upon any boundary switch being set into a first mode responsive to a control signal, then the adjacent loops are cross connected in order to facilitate an exchange of any records circulating therein, upon the boundary switches to any loop being set into a second mode also responsive to a control signal, then the loop is maintained as a circulation path, one end loop of the ladder and the associated boundary switch coupling the information handling means and being operative as an input-/output port; and the permutation network further comprising:

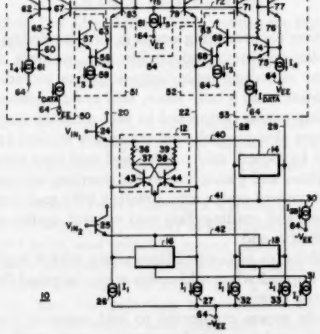
clocking means for causing all the loops to move their contents in synchronism.

4,078,261

SENSE/WRITE CIRCUITS FOR BIPOLAR RANDOM ACCESS MEMORY

Michael S. Millhollan, and Robert M. Reinschmidt, both of Tempe, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 2, 1976, Ser. No. 645,967
Int. Cl.² G11C *11/40*
U.S. Cl. 365—189 **8 Claims**



1. A memory circuit comprising:

a storage cell, said storage cell being a read/write type of storage cell;

bit conductor means coupled to said storage cell for transferring information to and from said storage cell;

sense circuit means coupled to said bit conductor means for sensing a stored state of said storage cell during a sensing operation of said memory circuit; and

coupling means coupled between said bit conductor means and said sense circuit means for operatively coupling said storage cell to said sense circuit means via said bit conductor means during said sensing operation and operatively isolating said sense circuit means from said storage cell during an operation of writing into said storage cell.

4,078,262

CONTROLLING AN IRON-ORE AGGLOMERATION PROCESS

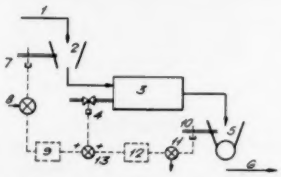
Henry Gilbert Meunier, Liege, and Jacques Toussaint Boelens, Sclessin, both of Belgium, assignors to Centre de Recherches Metallurgiques-Centrum voor Research de Metallurgie, Brussels, Belgium

Filed Aug. 24, 1976, Ser. No. 717,172

Claims priority, application Belgium, Aug. 26, 1975, 832778

Int. Cl.² B28C *7/12*; C22B *1/14*

U.S. Cl. 366—151 **3 Claims**



1. A method of controlling an iron-ore agglomeration process comprising: measuring the permeability of a mixture to be agglomerated, by means of a permeameter situated upstream of a mixer directly preceding a feed hopper feeding an agglomerating apparatus; adding water the mixture in the mixer; utilizing the measured permeability value to influence the quantity of water added in the mixer by means of an automatic feed-forward regulating loop; measuring the permeability of the mixture by means of a further permeameter situated downstream of the mixer and upstream of the feed hopper; and utilizing the measured permeability value thus obtained to influence the quantity of water added in the mixer by means of an automatic feedback regulating loop; and combining the influences of the two regulating loops so as to obtain at the output of the mixer a given value of the permeability of the mixture to be agglomerated.

4,078,263

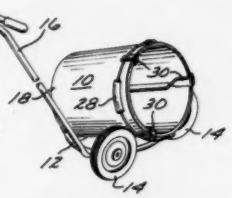
MANUALLY OPERATED MOBILE MIXER

Lloyd F. Campbell, 42 65th Pl., Long Beach, Calif. 90803

Filed Apr. 11, 1977, Ser. No. 786,226

Int. Cl.² B28C *5/20*

U.S. Cl. 366—53 **5 Claims**



1. A manually operated mobile mixer comprising:

a base having wheels and including a handle for rolling said base on said wheels over a supporting surface;

a cylindrical mixing container having its exterior surface in engagement with a pair of said wheels; and

pivot means on said base rotatably supporting said container whereby rolling said base over said supporting surface effects rotation of said container and mixing of materials therein, the weight of said materials tending to maintain said engagement.

DESIGN PATENTS

GRANTED MARCH 7, 1978

ERRATA

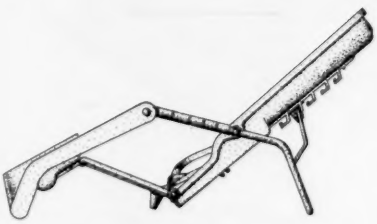
For CLASS	See PATENT NO.
D23–097	247,446
D24–064	247,458

DESIGNS

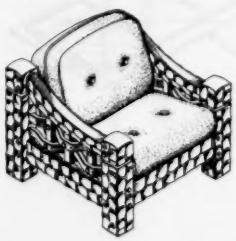
MARCH 7, 1978

247,396
SHOE OR SIMILAR ARTICLE
William A. Schlerth, c/o Charles Sonnenreich, 500 Fifth Ave., New York, N.Y. 10036
Filed Feb. 27, 1976, Ser. No. 662,235
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—282

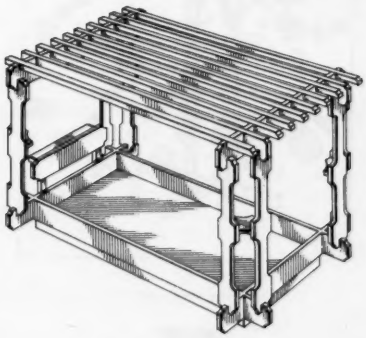
247,397
BABY CHAIR
Mitsuyo Tsumita, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan
Filed Jun. 3, 1976, Ser. No. 692,353
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—7



247,398
SEAT
Philip L. Null, Maiden, and Richard G. Brown, High Point, both of N.C., assignors to Null Manufacturing Corporation
Filed Sep. 13, 1976, Ser. No. 722,705
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—68

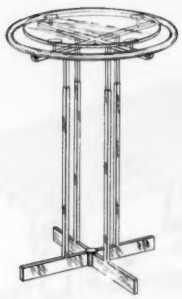


247,399
CANOPY BED FRAME
Larry L. Ragland, 1341 W. Campbell, Phoenix, Ariz. 85013
Filed Sep. 25, 1974, Ser. No. 509,108
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—83

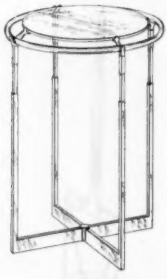


247,400
PLANT POT HOLDER
Farrell T. Foster, 2420 Holcomb, Des Moines, Iowa 50310
Filed Sep. 24, 1976, Ser. No. 726,402
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—113

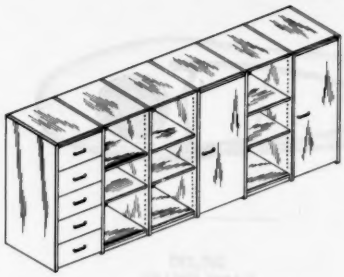
247,401
GARMENT DISPLAY RACK
Maurice Cohen, 3580 NW. 52nd St., Miami, Fla. 33142
Filed Jun. 27, 1977, Ser. No. 810,368
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—147



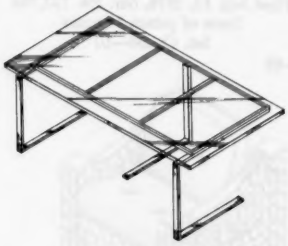
247,402
GARMENT DISPLAY RACK
Maurice Cohen, 3580 NW. 52nd St., Miami, Fla. 33142
Filed Jun. 27, 1977, Ser. No. 810,369
Term of patent 14 years
Int. Cl. D20—*02*
U.S. Cl. D6—147



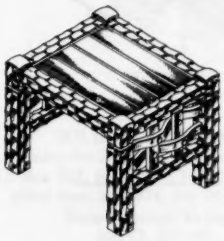
247,403
COMBINED MULTIPLE CABINET AND SHELF STORAGE UNIT
Walter Müller, Eschenstrasse, 8603 Schwerzenbach, Switzerland
Filed May 27, 1976, Ser. No. 690,569
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—164



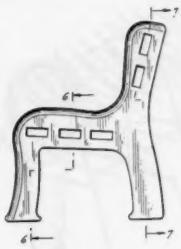
247,404
TABLE
Lafayte Harris, 3064 N. Glen, Altadena, Calif. 91001
Filed Aug. 12, 1976, Ser. No. 713,657
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



247,405
TABLE
Philip L. Null, Maiden, and Richard G. Brown, High Point, both of N.C., assignors to Null Manufacturing Corporation
Filed Sep. 13, 1976, Ser. No. 722,353
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—177

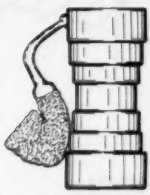


247,406
BENCH STANCHION
Otto Stahl, Cedar Grove Rd., Annandale, N.J. 08801, and William H. Koelbel, 14 Square Morrell St., Geneva, N.Y. 14456
Filed Apr. 19, 1976, Ser. No. 678,209
Term of patent 14 years
Int. Cl. D6—*06*
U.S. Cl. D6—193



247,407
BED SHEET OR THE LIKE
William B. Lammersen, Littleton, Colo., assignor to James E. Clabaugh; Craig H. Hooper and D. Kent Hooper
Filed Nov. 17, 1975, Ser. No. 632,504
Term of patent 14 years
Int. Cl. D6—*13*
U.S. Cl. D6—268

247,408
DRINKING VESSEL
Frank Ventura, 9932 Lindo Lake Pl., Lakeside, Calif. 92040
Filed Aug. 3, 1976, Ser. No. 711,413
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—5



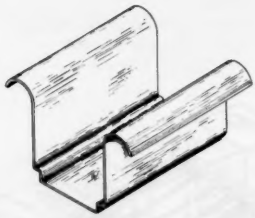
247,409
HANDLE FOR A TRAY OR THE LIKE
Harold O. Wagner, Sheffield Lake, and Samuel Scherr, Fairlawn, both of Ohio, assignors to American Trading & Production Corporation, Baltimore, Md.
Filed Feb. 25, 1976, Ser. No. 661,377
Term of patent 14 years
Int. Cl. D8—*06*; D7—*99*
U.S. Cl. D7—39

247,410
HANDLE FOR A CASSEROLE OR THE LIKE
Harold O. Wagner, Sheffield Lake, and Samuel Scherr, Fairlawn, both of Ohio, assignors to American Trading & Production Corporation, Baltimore, Md.
Filed Feb. 25, 1976, Ser. No. 661,378
Term of patent 14 years
Int. Cl. D7—*99;* D8—*06*
U.S. Cl. D7—39

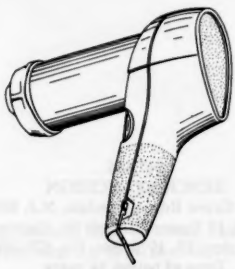
247,411
HANDLE FOR A HOSTESS TRAY OR THE LIKE
Harold O. Wagner, Sheffield Lake, and Samuel Scherr, Fairlawn, both of Ohio, assignors to American Trading & Production Corporation, Baltimore, Md.
Filed Feb. 25, 1976, Ser. No. 661,379
Term of patent 14 years
Int. Cl. D7—*99;* D8—*06*
U.S. Cl. D7—39

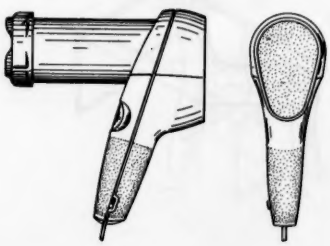
247,412
MEASURING SPOON SET
Edward N. Montesi, Barrington, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Jun. 23, 1976, Ser. No. 698,975
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—50

247,413
HOLDER FOR A BREAD TOASTER
Marshall Hamilton, 240 Bowman Dr., Newport, Tenn. 37821
Filed Feb. 13, 1976, Ser. No. 657,730
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—91



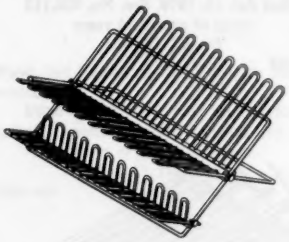
247,414
DISPENSING APPARATUS FOR COMESTIBLES OR SIMILAR ARTICLE
Donald E. Watkins, Parma, and Marshall B. Johnson, Chillicothe, both of Ohio, assignors to Aluminum Company of America, Pittsburgh, Pa.
Filed Jun. 9, 1976, Ser. No. 694,300
Term of patent 14 years
Int. Cl. D7—*04;* D8—*05*
U.S. Cl. D7—99



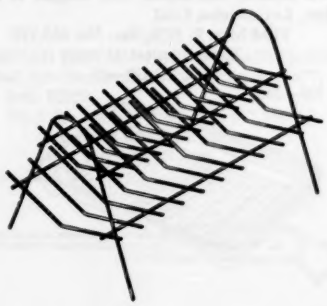


247,415
BOOT SCRAPER FOR ATTACHMENT TO SKIIS
J. William Harper, 4145 Via Marina, No. 318-7, Marina del Rey, Calif. 90291
Filed Aug. 24, 1976, Ser. No. 717,443
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—182

247,416
FOLDABLE DISHRACK
Bernard S. Berman; Bernard L. Schlossberg, and Maurice Kaye, all of P.O. Box 902, Hicksville, N.Y. 11802
Filed Nov. 22, 1976, Ser. No. 743,700
Term of patent 14 years
Int. Cl. D7—*05*
U.S. Cl. D7—188



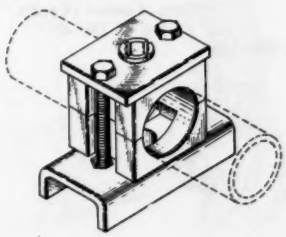
247,417
FIREPLACE GRATE
Edward J. Smith, 12559 Appaloosa Pl., Broomfield, Colo. 80020
Filed Feb. 16, 1977, Ser. No. 769,022
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207



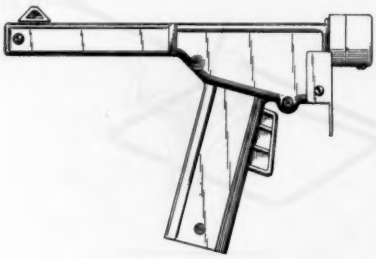
247,418
LOG BURNING SUPPORT
David L. Mick, 409 Madison Pl., Indianola, Iowa 50125
Filed Mar. 25, 1977, Ser. No. 781,368
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207

247,419
FIREPLACE GRATE
David L. Mick, 409 Madison Pl., Indianola, Iowa 50125
Filed Aug. 15, 1977, Ser. No. 824,398
Term of patent 14 years
Int. Cl. D7—*08*
U.S. Cl. D7—207

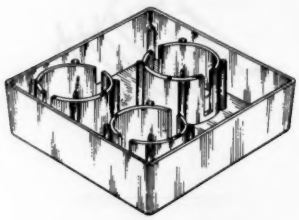
247,420
RAILROAD BRAKE PIPE HANGER
Clarke Reynolds, 16 St. Bernard La., Tiburon, Calif. 94920
Filed Feb. 23, 1976, Ser. No. 660,333
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—373



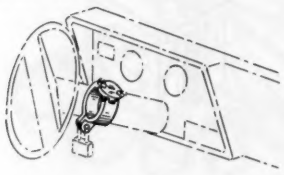
247,421
ELECTRODE HOLDER
John J. Driscoll, 422 S. 18th St., Allentown, Pa. 18104
Filed Jan. 21, 1977, Ser. No. 761,542
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—30



247,422
CHEMICAL CONTAINER OPENER AND DISPENSER
John C. Russell, P.O. Box 7801, Orlando, Fla. 32804
Filed Aug. 16, 1976, Ser. No. 714,686
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—33

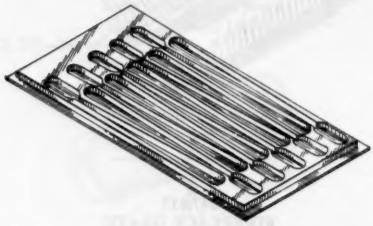


247,423
ANTI-THEFT GUARD FOR THE IGNITION SWITCH OF A MOTOR VEHICLE
Morris Kaplan, 4800 S. Chicago Beach Dr., Chicago, Ill. 60615
Filed Mar. 7, 1977, Ser. No. 774,777
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—333

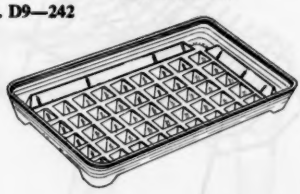


247,424
SWIRL BOTTLE
Warren J. Luedtke, Racine, Wis., assignor to S. C. Johnson & Son, Inc., Racine, Wis.
Continuation-in-part of Ser. No. 351,663, April 16, 1973, abandoned. This application Apr. 7, 1975, Ser. No. 565,980
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—42

247,425
COMBINED PACKAGING AND STORAGE TRAY FOR ARTIFICIAL FISHING WORMS OR THE LIKE
Carl R. Cordell, Jr., 215 Idlewood Dr., Hot Springs, Ark. 71901
Filed Jul. 16, 1976, Ser. No. 706,113
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—188



247,426
PACKAGING TRAY FOR SAUSAGE OR THE LIKE
Edward N. Montesi, Barrington, R.I., assignor to Dart Industries Inc., Los Angeles, Calif.
Filed Mar. 9, 1976, Ser. No. 665,198
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—242

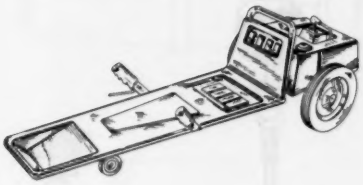


247,427
BAG
Gaston Fagniart, Valenciennes, France, assignor to Societe Anonyme dite: Boracier, Lausanne, Switzerland
Filed Oct. 20, 1975, Ser. No. 624,296
Term of patent 14 years
Int. Cl. D9—*05*
U.S. Cl. D9—249

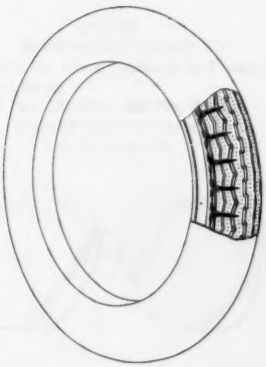
247,428
LEVEL
John L. Wood, 141 Edmonton Rd., Te Atatu South, Auckland, New Zealand
Filed Dec. 8, 1975, Ser. No. 638,400
Claims priority, application New Zealand, Jun. 6, 1975, 14081
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—82

247,429
COMBINED TIRE BUMPER AND AIR GAUGE
James P. Teal, c/o Donald E. Brooke, P.O. Box 477, Apache Junction, Ariz. 85220
Filed Jun. 21, 1976, Ser. No. 697,850
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—86

247,430
VEHICLE
Robert W. Walker, and Dean M. Walker, both of Loveland, Colo., assignors to Teledyne Industries, Inc., Ft. Collins, Colo.
Filed Oct. 26, 1976, Ser. No. 735,314
Term of patent 14 years
Int. Cl. D12—*09*
U.S. Cl. D12—88



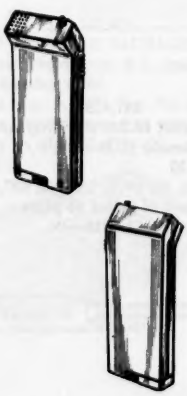
247,431
TIRE FOR A VEHICLE WHEEL
Anthony Mark Mills, Sutton Coldfield, England, assignor to Dunlop Limited, England
Filed Jan. 20, 1976, Ser. No. 650,743
Claims priority, application United Kingdom, Jul. 31, 1975, 972036/75
The portion of the term of this patent subsequent to Apr. 3, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D12—*15*
U.S. Cl. D12—141



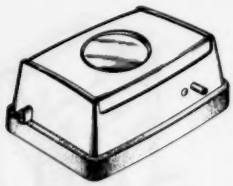
247,432
FINE AND COARSE TUNING ASSEMBLY FOR CAVITIES
James E. Scott, Austell, Ga., assignor to The United States of America as represented by the Field Operations Bureau of the Federal Communications Commission, Washington, D.C.
Continuation-in-part of Ser. No. D. 624,517, Oct. 21, 1975, abandoned. This application Feb. 28, 1977, Ser. No. 772,713
Term of patent 14 years
Int. Cl. D14—*99*
U.S. Cl. D14—99

247,433
HEADPHONE
Jon Scott Fixler, Philadelphia, Pa., assignor to F.D.B. Productions, Delran, N.J.
Filed Mar. 4, 1977, Ser. No. 774,505
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D14—36

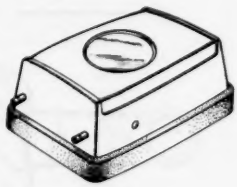
247,434
STAFF LOCATOR
Jan Hampf, Saro, Sweden, assignor to Ara-Bygg AB, Sweden
Filed Nov. 30, 1976, Ser. No. 746,146
Claims priority, application Sweden, Jun. 4, 1976, 1214/76
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. 14—52



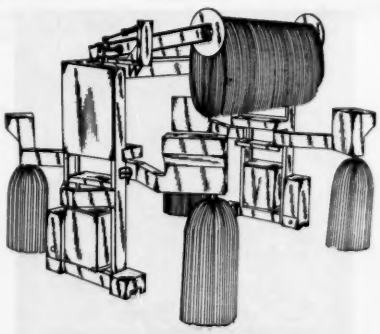
247,435
AQUARIUM AIR PUMP
Allan H. Willinger; Harding W. Willinger, and Monte L. Levin, all of New York, N.Y., assignors to Willinger Bros., Inc., New York, N.Y.
Filed Jul. 28, 1976, Ser. No. 709,546
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—8



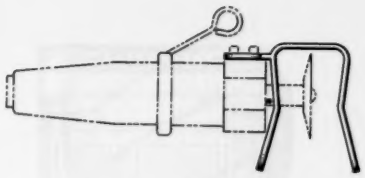
247,436
AQUARIUM AIR PUMP
Allan H. Willinger; Harding W. Willinger, and Monte L. Levin, all of New York, N.Y., assignors to Willinger Bros., Inc., New York, N.Y.
Continuation-in-part of Ser. No. D. 709,546, Jul. 28, 1976. This application Jan. 17, 1977, Ser. No. 759,775
Term of patent 14 years
Int. Cl. D15—*02*
U.S. Cl. D15—8



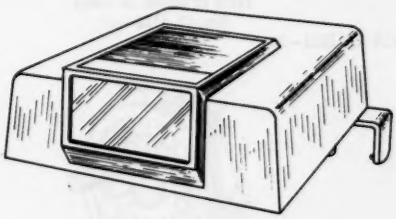
247,437
VEHICLE WASH MACHINE
James A. Nelson, Des Moines, Iowa, assignor to Ryko Mfg., Co., Des Moines, Iowa
Filed Mar. 1, 1976, Ser. No. 662,575
Term of patent 14 years
Int. Cl. D15—*05*
U.S. Cl. D15—37



247,438
POULTRY NECK SLITTER GUIDE
Paul L. Niccolls, 2209 N. Glenstone, Springfield, Mo. 65804
Filed Jan. 17, 1977, Ser. No. 759,847
Term of patent 14 years
Int. Cl. D15—*99*
U.S. Cl. D15—121

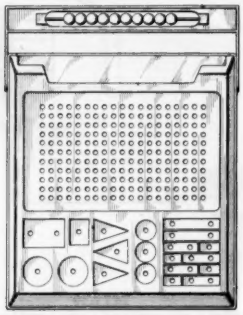


247,439
CAMERA PHOTOFLASH ATTACHMENT
James T. Asaki, Elyria, Ohio, assignor to International Telephone & Telegraph Corporation, Nutley, N.J.
Filed Mar. 11, 1976, Ser. No. 665,978
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D16—42

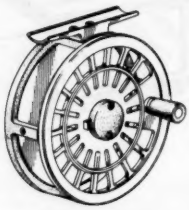


247,440
SPECTACLE FRONT
Jack Bloch, Leominster, Mass., assignor to Foster Grant Co., Inc., Leominster, Mass.
Filed Oct. 28, 1976, Ser. No. 736,619
Term of patent 14 years
Int. Cl. D16—*06*
U.S. Cl. D16—70

247,441
CHILD'S PORTABLE DRAWING, GAME AND PLAY BOX, OR SIMILAR ARTICLE
Frederick H. Kroll, 72 Wood Hollow La., New Rochelle, N.Y. 10804
Filed Dec. 15, 1975, Ser. No. 640,832
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—36

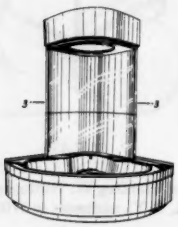


247,442
FISHING REEL
Ethuo Hiraishi, Hiroshima, and Takeshi Shohoji, Fukuyama, both of Japan, assignors to Ryobi Ltd., Fuchu, Japan
Filed Apr. 14, 1976, Ser. No. 676,781
Claims priority, application Japan, Nov. 28, 1975, 50-47225
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—25



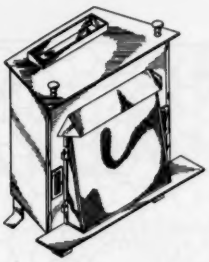
247,443
FISH CLEANING TOOL
Robert G. Catterfeld, 3515 Catterfeld La., Saginaw, Mich. 48601
Filed Jan. 26, 1977, Ser. No. 762,635
Term of patent 14 years
Int. Cl. D22—*05*
U.S. Cl. D22—31

247,444
COMBINED BATHTUB AND SHOWER STALL
Horst Godfrey Bonsack, London, England, assignor to Bonsack Baths Limited, London, England
Filed Sep. 20, 1976, Ser. No. 725,043
Claims priority, application United Kingdom, Apr. 1, 1976, 975153/76
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—49

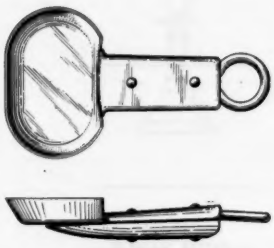


247,445
FLOOR TILE
Stanley King, New York, N.Y., assignor to Dunlop Limited, London, England
Filed May 11, 1976, Ser. No. 685,293
Term of patent 14 years
Int. Cl. D25—*01*
U.S. Cl. D25—80

247,446
FIREPLACE
Carrol E. Buckner, Weaverville, N.C., assignor to Smoky Mountain Enterprises, Asheville, N.C.
Division of Ser. No. 675,413, Apr. 9, 1976, Pat. No. Des. 244,136
This application Jan. 24, 1977, Ser. No. 762,087
Term of patent 14 years
Int. Cl. D23—*03*
U.S. Cl. D23—97

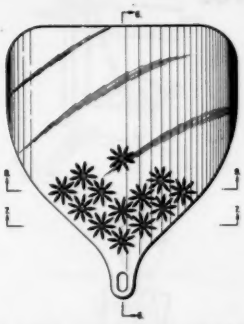


247,447
ASH TRAY
Julio Ricaud, Liverpool No. 54-304, Mexico City 6, Mexico
Filed Aug. 31, 1976, Ser. No. 719,207
Term of patent 14 years
Int. Cl. D27—*03;* D7—*04, 05*
U.S. Cl. D27—14

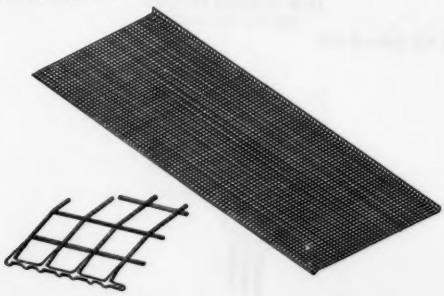


247,448
LIGHTER
Seymour Rappoport, Rumson, N.J., assignor to Ronson Corporation, Bridgewater, N.J.
Filed Jan. 31, 1977, Ser. No. 764,288
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

247,449
FACE SHIELD
Thomas Hannon, Rte. 5 Walnut Rd., Lockport, Ill. 60441
Filed Oct. 6, 1975, Ser. No. 620,232
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D28—9



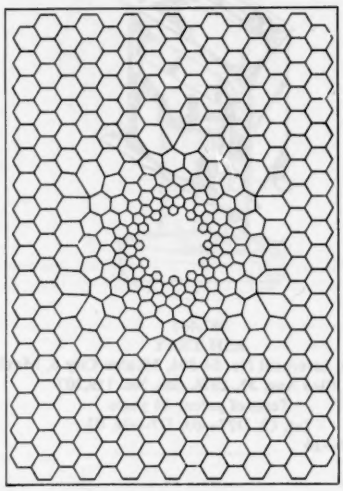
247,450
EGG RAMP FOR LIFE CYCLE POULTRY CAGE
Gerald L. Kitson, 9709 Belding Rd., Rockford, Mich. 49341
Continuation-in-part of Ser. No. 409,019, Oct. 23, 1973, Pat. No. Des. 241,356. This application Jun. 20, 1974, Ser. No. 481,390
The portion of the term of this patent subsequent to Sep. 7, 1990, has been disclaimed.
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—2



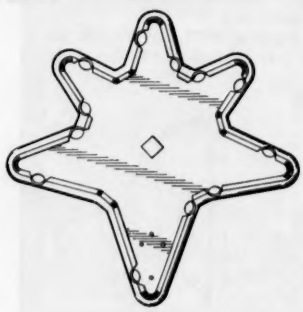
247,451
COMBINED GOLF TEE INDICATOR, BALL CLEANER AND WASTE RECEPTACLE
Leslie Leonard Sapier, Sydney, Australia, assignor to Maria Sapier, Vaucluse, Australia
Filed Nov. 10, 1975, Ser. No. 630,411
The portion of the term of this patent subsequent to Dec. 17, 1988, has been disclaimed.
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 QQ

247,452
COMBINED GOLF TOOL AND RANGE FINDER
Barry E. Kitay, Van Nuys, Calif., assignor to Maurice Jay Cooper and Ethel Cooper, Venice, Calif.
Filed Aug. 16, 1976, Ser. No. 714,957
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

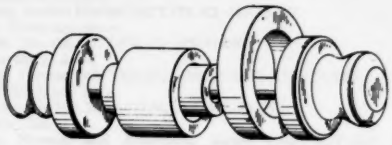
247,453
GAME BOARD
Richard Harrison Recard, 4615 N. Park Ave., Chevy Chase, Md. 20015
Filed Sep. 10, 1976, Ser. No. 722,120
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 SS



247,454
POOL TABLE
Frankie A. Salazar, 8592 ½ Midway Pl., Base Housing, El Toro, Calif. 92709
Filed Jul. 21, 1976, Ser. No. 707,422
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—3

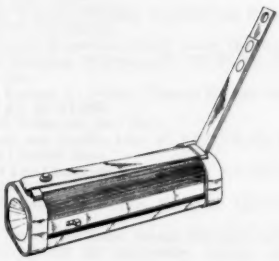


247,455
TOY RATTLE
Kerstin Margaretha Hagland-Ahrnborg, Falun, Sweden, assignor to Brio Toy AB, Osby, Sweden
Filed Jan. 5, 1976, Ser. No. 646,674
Claims priority, application Germany, Jul. 8, 1975, URA447/75
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 AG



247,456
MINIATURE CANDLESTICK FOR DOLLHOUSES AND THE LIKE
Norman Nelson, Southington, Conn., assignor to Nelson Tool and Machine Company, Inc., Southington, Conn.
Filed Jul. 12, 1976, Ser. No. 704,289
Term of patent 14 years
Int. Cl. D26—*01;* D21—*01*
U.S. Cl. D48—2

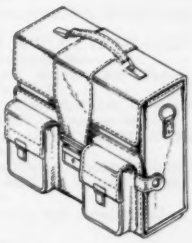
247,457
PORTABLE LIGHT
Thomas Zelina, Erie, Pa., assignor to Lighting Systems, Inc., Erie, Pa.
Filed Oct. 4, 1976, Ser. No. 729,587
Term of patent 14 years
Int. Cl. D26—*02*
U.S. Cl. D48—24 R



247,458
TRANSPORTING DEVICE FOR BATH- AND TOILET PURPOSES
Hans Arne Valentin Johansson, Trehseradsvaegen 40, s. 241, Eslov, Sweden
Filed Sep. 6, 1974, Ser. No. 503,717
Term of patent 14 years
Int. Cl. D24—*01*
U.S. Cl. D24—64

247,459
CARRYING CASE FOR CIRCULAR SAW BLADES
J. C. Tennison, Box 298, Gatesville, Tex. 76528
Filed Jul. 30, 1976, Ser. No. 710,337
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R

247,460
CARRYING CASE FOR A CAMERA AND ACCESSORIES OR THE LIKE
Sanford Sykes, 22201 Burbank Blvd., Woodland Hills, Calif. 91364
Filed Jul. 1, 1976, Ser. No. 701,547
Term of patent 14 years
Int. Cl. D3—*02*
U.S. Cl. D87—5 E



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF MARCH, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A. B. Dick Company: *See—*
Chapin, Leo N.; and Rhee, Young, 4,077,802, Cl. 96-1.00R.

A. M. Liaaen A/S: *See—*
Liaaen, Anders Marius, 4,077,352, Cl. 115-35.000.

A. Stucki Company: *See—*
Wiebe, Donald, 4,077,496, Cl. 188-33.000.

AB Gustavsberg: *See—*
Strom, Torsten Erik Theodor, 4,077,828, Cl. 156-429.000.

AB Malte Sandgren: *See—*
Olofsson, Sigfrid M., 4,077,442, Cl. 141-20.000.

AB Ziristor: *See—*
Pupp, Herwig; and Andersson, Birger Otto, 4,077,829, Cl. 156-446.000.

Abe, Masaru: *See—*
Miyoshi, Isao; Abe, Masaru; Tezuka, Toshiro; and Yoshimoto, Toshio, 4,077,454, Cl. 152-354.00R.

Abe, Nozomi: *See—*
Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, 4,077,971, Cl. 260-308.00B.

Abex Corporation: *See—*
Heyer, Bruce A.; and Huth, Donald L., 4,077,801, Cl. 75-122.000.

Ablad, Bengt Arne Hjalmar: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Abrasive Technology, Inc.: *See—*
Peterman, Loyal M., Jr., 4,077,164, Cl. 51-206.00P.

Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, to Daimler-Benz Aktiengesellschaft. Four-cycle reciprocating-piston internal combustion engine. 4,077,368, Cl. 123-32.0ST.

Acher, Jacques: *See—*
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,077,976, Cl. 260-326.200.

ACI Operations Pty, Ltd.: *See—*
Papaluca, Vincent, 4,077,182, Cl. 53-109.000.

Ackerman, Robert T., to Nicholson Manufacturing Company. Rotary drum wastewood chipper. 4,077,450, Cl. 144-172.000.

Acon, Inc.: *See—*
Hankel, Keith M., 4,077,491, Cl. 181-290.000.

Acres, Gary James Keith; and Cooper, Barry John, to Johnson, Matthey & Co., Limited. Catalyst. 4,077,913, Cl. 252-462.000.

Adachi, Saburo: *See—*
Nishino, Yasushi; Adachi, Saburo; and Karashima, Koji, 4,077,350, Cl. 114-260.000.

Adams, Lyle C.: *See—*
Mathias, Richard A.; Adams, Lyle C.; and Miller, Edward N., 4,078,195, Cl. 318-561.000.

Adler, Franklin P., to Pullman Incorporated. Opening and closing means for hinged trough covers on hopper cars. 4,077,329, Cl. 105-377.000.

Agence Nationale de Valorisation de la Recherche (ANVAR): *See—*
Lewiner, Jacques; and Dreyfus, Gerard, 4,078,183, Cl. 307-112.000.
Pelletier, Jacques; and Rinchet, Francois, 4,078,164, Cl. 219-121.0LM.

Agent, J. Richard; Nielsen, Donald W.; and Cooper, Thomas A., to Portion Packaging, Inc. Method and apparatus for packaging fluent material. 4,077,180, Cl. 53-37.000.

AGFA-Gevaert, A.G.: *See—*
Brandstatter, Wilhelm; Haschka, Gerhard; and Heindze, Herbert, 4,078,108, Cl. 428-480.000.
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, 4,077,708, Cl. 353-27.00R.

Aine, Harry E.: *See—*
Boothroyd, Rodney L.; Wedge, Thomas E.; and Aine, Harry E., 4,077,177, Cl. 52-741.000.

Air Products and Chemicals, Inc.: *See—*
Sircar, Shivaji; and Zondlo, John W., 4,077,779, Cl. 55-25.000.

Airfix Industries Limited: *See—*
Sutch, Brian Leo Chudleigh, 4,078,037, Cl. 264-266.000.

Aisin Seiki Kabushiki Kaisha: *See—*
Takeshita, Hiroshi; and Kondo, Hiroyuki, 4,077,673, Cl. 303-24.00F.

Akado, Hajime; Kamo, Hideo; and Nakane, Kazunori, to Nippondenso Co., Ltd. Air cleaner for automotive vehicle. 4,077,787, Cl. 55-419.000.

Akamatsu, Hiroyuki, to Ricoh Company, Ltd. Electrophotographic copying apparatus of wet developing type. 4,077,711, Cl. 355-10.000.

Akamatsu, Takashi: *See—*
Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, 4,077,971, Cl. 260-308.00B.

Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, to Meiji Seika Kaisha, Ltd. 3'-Epi-4'deoxykanamycin B. 4,078,138, Cl. 536-10.000.

Aktiebolaget Hassle: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Akzona Incorporated: *See—*
McNeill, William Allen, 4,077,097, Cl. 28-281.000.
Shapiro, Sydney Harold; Johnson, Dale Howard; and Nemeth, Harold Charles, 4,078,105, Cl. 427-417.000.

Alban, Thomas W.: *See—*
Hyde, Glenn F.; and Alban, Thomas W., 4,077,637, Cl. 277-235.00A.

Albrecht, George Werner, to RCA Corporation. Inverter circuit control circuit for precluding simultaneous conduction of thyristors. 4,078,247, Cl. 363-96.000.

Albrecht, Konrad; Frensch, Heinz; Hartel, Kurt; and Stingl, Helmut, to Hoechst Aktiengesellschaft. Fungicidal dispersions. 4,078,070, Cl. 424-273.00R.

Albright & Wilson Ltd.: *See—*
Cole, Robert, 4,078,101, Cl. 427-341.000.

Alcolac, Inc.: *See—*
Panzer, George W., 4,077,917, Cl. 252-545.000.

Aldrich-Boranes, Inc.: *See—*
Brown, Herbert C., 4,078,002, Cl. 260-583.00K.

Aldridge, Clyde L.; and Bearden, Roby, Jr., to Exxon Research & Engineering Co. Hydroconversion of coal in a hydrogen donor solvent with an oil-soluble catalyst. 4,077,867, Cl. 208-10.000.

Aldworth, John G.: *See—*
Whirlow, Donald K.; Aldworth, John G.; and Wilburn, Garlington C., 4,078,149, Cl. 174-15.00R.

Alfa-Laval AB: *See—*
Thylefors, Henric Wilhelm, 4,077,564, Cl. 233-20.00A.

Alfa Romeo S.p.A.: *See—*
Busso, Giuseppe, 4,077,272, Cl. 74-242.1FP.

Alkins, James G. Telephone pencil holder. 4,077,521, Cl. 211-69.100.

Allerheiligen, Arnold G. Means for cushioning wooden pews or the like. 4,077,667, Cl. 297-445.000.

Allgaier, Werner M.: *See—*
Ellis, Roger M.; and Allgaier, Werner M., 4,077,692, Cl. 339-103.00M.

Allied Chemical Corporation: *See—*
Barrett, Joseph J.; and Begley, Richard F., 4,077,719, Cl. 356-75.000.
Bedell, John R.; Rothmayer, Noel Y.; Saunders, Ralph R.; and Smith, Robert W., 4,077,462, Cl. 164-429.000.

Alling, Richard Lassen: *See—*
Bhateja, Chander Prakash; and Alling, Richard Lassen, 4,077,683, Cl. 308-235.000.

Allis-Chalmers Corporation: *See—*
Gallatin, Paul M., 4,078,220, Cl. 335-270.000.

Altec Corporation: *See—*
Vinson, Billy Herman, 4,078,215, Cl. 333-70.00R.

Alwardt, Marlin: *See—*
Cunningham, Dean; Goeckner, Ralph; Alwardt, Marlin; and Wohltman, Leon, 4,077,116, Cl. 29-727.000.

Alza Corporation: *See—*
Theeuwes, Felix; and Ayer, Atul D., 4,077,407, Cl. 128-260.000.

AMAX, Inc.: *See—*
Burman, Russell W., 4,077,811, Cl. 148-11.50F.

American Cyanamid Company: *See—*
Sandhage, Ellsworth Roland; and Taylor, Arthur Sinclair, 4,077,406, Cl. 128-217.000.
Schrider, Michael Stanley, 4,078,080, Cl. 424-304.000.

American Home Products Corporation: *See—*
Sarantakis, Dimitrios, 4,077,952, Cl. 260-112.50S.

AMF Incorporated: *See—*
Kersey, Carl H.; and Hansen, Charles D., 4,077,573, Cl. 241-32.000.
Southall, Kenneth, 4,077,876, Cl. 210-136.000.

Amidon, Alan B.: *See—*
Pacansky, Thomas J.; and Amidon, Alan B., 4,077,325, Cl. 101-467.000.

AMP Incorporated: *See—*
Bakermans, Johannes Cornelis Wilhelmus, 4,077,695, Cl. 339-176.0MF.
Cobaugh, Robert Franklin; and Coller, James Ray, 4,077,688, Cl. 339-74.00R.

Cobaugh, Robert Franklin; and Coller, James Ray, 4,077,694, Cl. 339-176.0MP.
Coller, James Ray; and Shannon, Suel Grant, 4,077,443, Cl. 141-111.000.
Redmond, John Peter; Shirk, Albert; Bottiglier, Elmer John; and Zimmerman, Richard Henry, 4,078,096, Cl. 427-98.000.
Amurri, Aldo. Stable structure for cattle self-feeding and open air pen cattle breeding. 4,077,359, Cl. 119-16.000.
Anderson Bros. Mfg. Co.: *See*—
Strombeck, Leo; and Anderson, Ralph F., 4,077,188, Cl. 53-310.000.
Anderson, David Robert; and Jenkins, Vaughn Junior, to Sperry Rand Corporation. Capstan speed control system. 4,078,193, Cl. 318-317.000.
Anderson, George Edward: *See*—
United States of America, National Aeronautics and Space Administration; Anderson, George Edward; Fell, Donald Maurice; and Tesinsky, Jerry Stanley, 4,078,110, Cl. 428-93.000.
Anderson, Ralph F.: *See*—
Strombeck, Leo; and Anderson, Ralph F., 4,077,188, Cl. 53-310.000.
Anderson, Richard E. Underwater diving mask. 4,077,068, Cl. 2-428.000.
Anderson, William M., Jr.: *See*—
Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, William M., Jr., 4,077,106, Cl. 29-792.000.
Andersson, Birger Otto: *See*—
Pupp, Herwig; and Andersson, Birger Otto, 4,077,829, Cl. 156-446.000.
Andre, Thierry: *See*—
Melchior, Jean; and Andre, Thierry, 4,077,219, Cl. 60-599.000.
Andrews, Joseph J., to Keystone Automated Equipment Co. Paint spraying machine. 4,077,356, Cl. 118-301.000.
Aoki, Keiji, to Toyota Jidosha Kogyo Kabushiki Kaisha. Electronic control fuel supply system. 4,077,364, Cl. 123-32.0EH.
Aoki, Shun: *See*—
Bando, Mitsuru; and Aoki, Shun, 4,077,622, Cl. 271-183.000.
Arai, Haruhiko: *See*—
Naganuma, Yoshinori; and Arai, Haruhiko, 4,078,055, Cl. 424-76.000.
Arai, Katsuhiko: *See*—
Yukuta, Toshio; Ohashi, Takashi; and Arai, Katsuhiko, 4,077,920, Cl. 260-2.5AM.
Arai, Yutaka: *See*—
Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, 4,077,266, Cl. 73-517.00A.
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and Di Marco, Aurelia, to Societa' Farmaceutici Italia, S.p.A. Optically active anthracyclinones. 4,077,988, Cl. 260-376.000.
Arce, Henry Leyva, to Coast Catamaran Corporation. Halyard latch apparatus for a sailboat. 4,077,347, Cl. 114-108.000.
Arizona Chemical Company: *See*—
Wang, Long Shyong; and Ruckel, Erwin Richard, 4,077,905, Cl. 252-429.00A.
Arlt, Dieter: *See*—
Lantzsch, Reinhard; Arlt, Dieter; and Kysela, Ernst, 4,078,008, Cl. 260-655.000.
Armco Steel Corporation: *See*—
Thornton, John A.; and Compton, Thomas A., 4,078,103, Cl. 427-349.000.
Armstrong, J. Delvin. Apparatus for promoting plant growth with artificial light. 4,078,169, Cl. 362-122.000.
Arndt, Friedrich; and Boroschewski, Gerhard, to Schering Aktiengesellschaft. Selective herbicides. 4,077,798, Cl. 71-100.000.
Arney, Donald B.; and Buckle, Jon L. S. Destructive mechanism for automobile tape decks, radios and the like. 4,078,182, Cl. 307-10.0AT.
Arnold, John L.; and Boyle, Raymond W. Encapsulation of nuclear wastes. 4,077,901, Cl. 252-301.10W.
Aronoff, Elihu J.; and Dhami, Kewal Singh, to International Telephone and Telegraph Corporation. Wire coated with diallyl esters of dicarboxylic acids. 4,078,114, Cl. 428-379.000.
Arrington, Bruce W.: *See*—
Cohen, M. Roy; Arrington, Bruce W.; and Pittendreigh, William W., 4,077,241, Cl. 70-371.000.
Artzt, Peter; Bauer, Herbert; Egbers, Gerhard; and Tabibi, Sohrab, to Schubert & Salzer. Method and apparatus for monitoring the flaws in spun yarn produced on open end rotor spinning machines. 4,078,231, Cl. 340-259.000.
Asahi, Naotatsu: *See*—
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.
Asakawa, Shirow; Saito, Yukihiro; and Hasegawa, Katsue. Light-sensitive composition containing antioxidant. 4,077,805, Cl. 96-115.00P.
Asano, Kiyoji, to Shinsei Kogyo Co., Ltd. Toy vehicle with energy storing mechanism. 4,077,156, Cl. 46-206.000.
Aschmann, Heinz: *See*—
Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, 4,078,003, Cl. 260-583.00P.
Ashauer, Karl; and Sendzik, Klaus, to Volkswagenwerk Aktiengesellschaft. Shaft mounting apparatus. 4,077,680, Cl. 308-70.000.
Asher, Leslie K.; Gibson, Charles E.; and Roetter, Frank T., to Pitney-Bowes, Inc. Inserting apparatus. 4,077,181, Cl. 53-78.000.
Ashland Oil, Inc.: *See*—
Langer, Heimo J.; and McKillip, William J., 4,078,115, Cl. 428-395.000.
Leitheiser, Robert H.; and Peloza, Casimir C., 4,077,931, Cl. 260-29.6NR.
Associated Portland Cement Manufacturers Limited, The: *See*—
Davies, William Grenville; and Beedle, Howard Victor Andrew, 4,077,994, Cl. 260-448.20E.
Atavin, Alexandr Spiridonovich: *See*—
Trofimov, Boris Alexandrovich; Atavin, Alexandr Spiridonovich; Mikhaleva, Albina Ivanovna; Kalabin, Gennady Alexandrovich; and Chebatareva, Ekaterina Grigorievna, 4,077,975, Cl. 260-319.100.
Atlas Copco Aktiebolag: *See*—
Sundstrom, Nils Goran, 4,077,781, Cl. 55-96.000.
Aubert, Roger, to Commissariat a l'Energie Atomique. Nuclear reactor with locking-key safety mechanism. 4,077,840, Cl. 176-87.000.
Audi NSU Auto Union AG: *See*—
Naumann, Fritz Albert, 4,077,884, Cl. 210-172.000.
Auto Specialties Manufacturing Company: *See*—
Nehrig, R. Harlan, 4,077,608, Cl. 254-93.00H.
Autoclave Engineers, Inc.: *See*—
Fryer, Donald M.; and Reber, Richard K., 4,077,527, Cl. 214-17.00B.
Avco Corporation: *See*—
Langan, Marion J., 4,078,156, Cl. 179-15.0BL.
Ayer, Atul D.: *See*—
Theeuwes, Felix; and Ayer, Atul D., 4,077,407, Cl. 128-260.000.
Ayusawa, Saburo; and Tanaka, Mansei, to Nippon Steel Corporation. Apparatus for manufacturing a metallic tube coated with a thermoplastic resin film having little residual strain. 4,077,098, Cl. 29-33.00T.
Ayyagari, Radhakrishna, to Boeing Company, The. Gas turbine mixer apparatus for suppressing engine core noise and engine fan noise. 4,077,206, Cl. 60-262.000.
Aziende Colori Nazionali Affini-ACNA S.p.A.: *See*—
Rosati, Enzo, 4,077,765, Cl. 8-41.00B.
B.S.G. International Limited: *See*—
Lafont, Raymond, 4,077,584, Cl. 242-107.40A.
Baaso, George L. Self load/unload trailer. 4,077,534, Cl. 214-396.000.
Babcock & Wilcox, Limited: *See*—
Hawkins, Ronald James, 4,077,362, Cl. 122-491.000.
Babej, Milos; Bartmann, Wilhelm; and Lerch, Ulrich, to Hoechst Aktiengesellschaft. Novel prostanoic acids. 4,078,083, Cl. 424-317.000.
Babej, Milos: *See*—
Lerch, Ulrich; Babej, Milos; Bartmann, Wilhelm; and Kunstmann, Rudolf, 4,078,081, Cl. 424-305.000.
Baconet, Daniel Diony: *See*—
Leyrat, Pierre Jean; and Baconet, Daniel Diony, 4,077,529, Cl. 214-145.00R.
Bagley, Alan S., to Hewlett-Packard Company. Calculator apparatus with electronically alterable key symbols. 4,078,257, Cl. 364-900.000.
Baker, Richard Roland; Green, Sydney James; and Kilburn, Keith Douglas, to Brown & Williamson Tobacco Corporation. Smoking articles. 4,077,414, Cl. 131-8.00R.
Bakermans, Johannes Cornelis Wilhelmus, to AMP Incorporated. Termination means for ribbon cables. 4,077,695, Cl. 339-176.0MF.
Balkanli, Hayati, to Lynes, Inc. Optical analog to digital converter. 4,078,232, Cl. 340-347.00P.
Ballas, George C. Adjustable table. 4,077,333, Cl. 108-6.000.
Ballas, George C., Sr.: *See*—
Dortch, Charles W.; and Vaught, Donald K., 4,077,645, Cl. 280-204.000.
Ballin, Betty: *See*—
Ballin, Gene, 4,077,562, Cl. 229-62.000.
Ballin, Gene, to Ballin, Betty. Tie strip. 4,077,562, Cl. 229-62.000.
Balz, Gunther W., to Roto-Finish Company. Finishing apparatus and method. 4,077,162, Cl. 51-163.100.
Banas, Conrad M.; and Rogers, Harry C., Jr., to United Technologies Corporation. Welding shield and plasma suppressor apparatus. 4,078,167, Cl. 219-121.00R.
Bando, Mitsuru; and Aoki, Shun, to Kubota, Ltd. Apparatus and method for transferring soft panels from conveying surface. 4,077,622, Cl. 271-183.000.
Banno, Shuji: *See*—
Yamagata, Totaro; and Banno, Shuji, 4,078,129, Cl. 526-11.000.
Baram, Martin. Disc brake actuator. 4,077,499, Cl. 188-72.400.
Barker, Graham. Composition for treating fabrics, method for making and using the same. 4,077,890, Cl. 252-8.800.
Barlow, George J.: *See*—
Nibby, Chester M., Jr.; and Barlow, George J., 4,077,565, Cl. 235-312.000.
Barmag Barmer Maschinenfabrik Aktiengellschaft: *See*—
Czerwon, Dieter; Ruppel, Friedrich; and Braun, Siegfried, 4,078,033, Cl. 264-178.00R.
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, to Roussel UCLAF. Novel xanthone-2-carboxylic acid compounds. 4,078,078, Cl. 424-283.000.
Barnes, Benny B.: *See*—
Kisslinger, Robert L.; Barnes, Benny B.; and Tuttle, Frederick L., 4,077,518, Cl. 206-583.000.
Barnes, Richard D., to Garcia Corporation, The. Fishing rod handle assembly. 4,077,150, Cl. 43-23.000.
Barrett, Joseph J.; and Begley, Richard F., to Allied Chemical Corporation. Continuous wave generation of coherent vibrational anti-stokes spectra. 4,077,719, Cl. 356-75.000.

Bartmann, Wilhelm: *See*—
Babej, Milos; Bartmann, Wilhelm; and Lerch, Ulrich, 4,078,083, Cl. 424-317.000.
Lerch, Ulrich; Babej, Milos; Bartmann, Wilhelm; and Kunstmann, Rudolf, 4,078,081, Cl. 424-305.000.
Barton, Derek H. R.; and McCombie, Stuart W., to Schering Corporation. Process for deoxygenating secondary alcohols. 4,078,139, Cl. 536-17.000.
Basevi, John. Pivoted clip. 4,077,092, Cl. 24-81.0CC.
BASF Aktiengesellschaft: *See*—
Blechschmitt, Kurt; Reuter, Peter; Wirth, Friedrich; and Hornberger, Paul, 4,077,984, Cl. 260-346.400.
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,077,797, Cl. 71-92.000.
Habermann, Wolfgang; Stockburger, Dieter; Thoma, Peter; and Csizi, Gotthard, 4,077,856, Cl. 204-149.000.
BASF Wyandotte Corporation: *See*—
Langdon, William Keith; and Dutton, Daniel Ronan, 4,077,894, Cl. 252-76.000.
Langdon, William Keith; and Dutton, Daniel Ronan, 4,077,895, Cl. 252-76.000.
Bass, Sidney; May, Herbert; and Rich, Hubert Allen, to Mattel, Inc. Cartridge sewing machine accessory. 4,077,339, Cl. 112-121.270.
Bateman, Donald L. Self extinguishing fire pit. 4,077,387, Cl. 126-8.000.
Bates, Dean E. Drop frame trailer. 4,077,643, Cl. 280-43.180.
Batozsky, Vadim Ivanovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.
Battelle Development Corporation: *See*—
Khera, Surjit Singh, 4,077,907, Cl. 252-439.000.
Khera, Surjit Singh, 4,077,995, Cl. 260-449.60M.
Bauer, Fred: *See*—
Dick, David Cochrane; and Bauer, Fred, 4,077,735, Cl. 407-89.000.
Bauer, Frederick. Truss joists. 4,077,176, Cl. 52-693.000.
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, to Eisenbau Wyhlen AG; and VAW Leichmetall GmbH. Apparatus for transporting, treating and storing articles. 4,077,245, Cl. 72-250.000.
Bauer, Herbert: *See*—
Artzt, Peter; Bauer, Herbert; Egbers, Gerhard; and Tabibi, Sohrab, 4,078,231, Cl. 340-259.000.
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, to Bayer Aktiengesellschaft. Process for the preparation and conditioning of copper phthalocyanine. 4,077,972, Cl. 260-314.500.
Baxter Travenol Laboratories, Inc.: *See*—
Cromie, Harry W.; Fitzgerald, James A.; Kopp, Clinton V.; and Washington, Freddie L., 4,077,578, Cl. 242-18.00G.
Ellis, William Garrettson; Heavner, Paul William, Jr.; and Daugherty, Charles W., 4,077,397, Cl. 128-2.06E.
Ellis, William Garrettson, 4,077,398, Cl. 128-2.06E.
Geissler, Ulrich C.; Stith, William J.; and Jewett, Kathleen J., 4,077,772, Cl. 23-230.00B.
Bayer Aktiengesellschaft: *See*—
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, 4,077,972, Cl. 260-314.500.
Beecken, Hermann, 4,077,962, Cl. 260-383.0CN.
Bleck, Wolf-Eckhard; Nickel, Horst; and Kramer, Erich, 4,077,767, Cl. 8-85.00R.
Corte, Herbert; Heller, Harold; and Netz, Otto, 4,077,918, Cl. 260-2.10E.
Enders, Edgar; and Stendel, Wilhelm, 4,077,981, Cl. 260-326.850.
Harms, Wolfgang; and Hullstrung, Dieter, 4,077,987, Cl. 260-374.000.
Lantzsch, Reinhard; Arlt, Dieter; and Kysela, Ernst, 4,078,008, Cl. 260-655.000.
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.
Schafer, Walter; and Wagner, Kuno, 4,077,989, Cl. 260-404.500.
Spreckelmeyer, Bernhard, 4,078,047, Cl. 423-485.000.
Wessling, Diether, 4,077,974, Cl. 260-314.500.
BBC Brown, Boveri & Company Limited: *See*—
Buser, Werner, 4,078,201, Cl. 324-233.000.
Potz, Franz, 4,077,748, Cl. 417-319.000.
Beard, Walter C. Trigger actuator for dispensing pumps with saddle pull-down. 4,077,548, Cl. 222-321.000.
Beard, Walter C. Trigger actuator for dispensing pumps. 4,077,549, Cl. 222-321.000.
Bearden, Roby, Jr.: *See*—
Aldridge, Clyde L.; and Bearden, Roby, Jr., 4,077,867, Cl. 208-10.000.
Beatrice Foods: *See*—
Smits, Willem C., 4,077,144, Cl. 40-590.000.
Beatty, Ronald L.: *See*—
Lindemer, Terrence B.; Long, Ernest L., Jr.; and Beatty, Ronald L., 4,077,838, Cl. 176-68.000.
Beausoleil, William F.; and Phelps, Byron E., to International Business Machines Corporation. Hierarchical memory with dedicated high speed buffers. 4,078,254, Cl. 364-900.000.
Beavers, Allan E., to T. A. Pelsue Company. Combination tent and frame therefor. 4,077,417, Cl. 135-3.00R.
Becher, Wilfried; and Massonne, Joachim, to Kali-Chemie Aktiengesellschaft. Process for preparing calcium fluoride from hexafluoro silicic acid and production of silicic acid gel or active silicic acid from said calcium fluoride. 4,078,043, Cl. 423-335.000.
Becker, Burckhardt: *See*—
Kluge, Erwin; and Becker, Burckhardt, 4,077,275, Cl. 74-473.00R.
Becker, James H.: *See*—
Pacansky, Thomas J.; and Becker, James H., 4,077,324, Cl. 101-450.000.
Beckman Instruments, Inc.: *See*—
Neti, Radhakrishna Murty; and Graham, Laurence Drell, 4,077,774, Cl. 23-232.00R.
Bedell, John R.; Rothmayer, Noel Y.; Saunders, Ralph R.; and Smith, Robert W., to Allied Chemical Corporation. Chill roll casting of continuous filament. 4,077,462, Cl. 164-429.000.
Beecken, Hermann, to Bayer Aktiengesellschaft. Styryl dyestuffs. 4,077,962, Cl. 260-383.0CN.
Beedle, Howard Victor Andrew: *See*—
Davies, William Grenville; and Beedle, Howard Victor Andrew, 4,077,994, Cl. 260-448.20E.
Beeskow, Bruno: *See*—
Hornig, Rudolf; Beeskow, Bruno; and Worner, Gunter, 4,077,233, Cl. 64-11.00R.
Begley, Richard F.: *See*—
Barrett, Joseph J.; and Begley, Richard F., 4,077,719, Cl. 356-75.000.
Behrenz, Wolfgang: *See*—
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.
Beimesch, Wayne Edward; and Walsh, Michael Andrew, to Procter & Gamble Company, The. Fabric treatment compositions. 4,077,891, Cl. 252-8.800.
Bell, Oliver A., Jr.; and Gilleland, Randall C. Programmable current control system for wire electrode electrical discharge machining apparatus. 4,078,163, Cl. 219-69.00C.
Bell Telephone Laboratories, Incorporated: *See*—
Evans, James Gifford, 4,078,255, Cl. 364-717.000.
Koontz, Donald Eldridge; and Skurkiss, Peter Kenny, 4,077,852, Cl. 204-15.000.
Seidel, Harold, 4,078,256, Cl. 364-851.000.
Simms, Douglas Leon; Skurkiss, Peter Kenny; and White, Clark Woody, 4,077,851, Cl. 204-15.000.
Bellavance, David W., to Texas Instruments Incorporated. Making a semiconductor laser structure by liquid phase epitaxy. 4,077,817, Cl. 148-171.000.
Belolipetsky, Alexei Yakovlevich; Levochkin, Pavel Afanasievich; Jurkovsky, Ivan Ivanovich; and Kolomiets, Boris Makarovich, deceased (by Kolomiets, Lidia Vasilivna, administrator). Ground-effect landing gear for aircraft. 4,077,589, Cl. 244-100.00A.
Bemus, Richard D.: *See*—
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.
Bender, Robert W.: *See*—
Prodo, Kenneth W.; and Bender, Robert W., 4,077,990, Cl. 260-404.500.
Bendix Corporation, The: *See*—
Estep, Gordon J.; and Burton, Bernard Lee, 4,077,854, Cl. 204-37.00R.
Bendz, Diana Jean; and Bendz, Gerald Andrei, to International Business Machines Corporation. Process for stripping resist layers from substrates. 4,078,102, Cl. 427-341.000.
Bendz, Gerald Andrei: *See*—
Bendz, Diana Jean; and Bendz, Gerald Andrei, 4,078,102, Cl. 427-341.000.
Benes, Milan; and Peska, Jan, to Ceskoslovensak akademie Ved. Quaternary salts of methacrylic or acrylic esters. 4,077,963, Cl. 260-290.00V.
Benjamin, J. Malvern, Jr.; Bolgiano, D. Ridgely; and McHenry, Carl R. Apparatus for promoting blood circulation. 4,077,402, Cl. 128-24.00R.
Bennett, Clarence L., Jr.; Bohman, Carl E.; DeLorenzo, Joseph D.; and Wilhelmsen, Harald, to Sperry Rand Corporation. Guidance assist system for agricultural machines. 4,077,488, Cl. 180-98.000.
Bennett, Richard Nelson: *See*—
Rosen, Sidney; and Bennett, Richard Nelson, 4,077,441, Cl. 141-1.000.
Bennett, Robert Gordon, Jr.; and Parrella, Alfred Theodore, to USM Corporation. Pivot mechanism for grinding wheel infeed. 4,077,163, Cl. 51-165.770.
Beno, Lawrence A., to United States of America, Navy. Microwave crossover switch. 4,078,214, Cl. 333-7.00D.
Beno, Lawrence A., to United States of America, Navy. Microwave isolation switch. 4,078,217, Cl. 333-97.00S.
Benson, Gustav E.; and Taylor, Everett W., to Owens-Corning Fiberglas Corporation. Apparatus and method for treating linear material. 4,077,084, Cl. 15-306.00A.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, to Richardson-Merrell Inc. Method of inducing an estrogenic response. 4,078,060, Cl. 424-242.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, to Richardson-Merrell Inc. Method of treating acne. 4,078,061, Cl. 424-242.000.
Berezovsky, Alexandr Vladimirovich: *See*—
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmuk-

homedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.

Berg, Vernon R., Jr. Manure pump. 4,077,509, Cl. 198-747.000.

Beriger, Ernst, to Ciba-Geigy Corporation. Insecticidally active 3-N-(4-trifluoromethylphenyl)-carbamoyl-4-hydroxy-coumarin. 4,078,075, Cl. 424-281.000.

Berliner, Gustave. Ball projecting apparatus. 4,077,386, Cl. 124-78.000.

Bernardi, Luigi; Foglio, Maurizio; and Francheschi, Giovanni, to Societa' Farmaceutici Italia S.p.A. Process for preparing azetidinone thiazolidine derivatives. 4,077,969, Cl. 260-306.70C.

Bernardi, Luigi: *See*—
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and Di Marco, Aurelia, 4,077,988, Cl. 260-376.000.
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.

Bernhardt, Emil: *See*—
Kiesewetter, Werner; Bernhardt, Emil; and Hutterer, Robert, 4,077,317, Cl. 101-37.000.

Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, to Aktiebolaget Hassle. Phenoxy propanolamines. 4,078,146, Cl. 560-160.000.

Berthoux, Jean Louis; and Langrenne, Albert, to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme). Holder for magnetic discs. 4,078,246, Cl. 360-133.000.

Bertin & Cie: *See*—
Boquet, Jean Pierre Michel, 4,077,507, Cl. 198-619.000.

Bertolacini, Ralph J.; and Brennan, Harry M., to Standard Oil Company (Indiana). Non-noble-metal-mordenite reforming catalyst. 4,077,909, Cl. 252-455.00Z.

Beyl, Jean Joseph Alfred. Heel hold-down plate or pivot member of safety ski binding. 4,077,653, Cl. 280-620.000.

Bhateja, Chander Prakash; and Alling, Richard Lassen, to Torrington Company, The. Roller thrust bearing cage and roller assembly. 4,077,683, Cl. 308-235.000.

Bibeau, Alexander Armand, to Union Carbide Corporation. Coating modification process for ultrafiltration systems. 4,078,112, Cl. 427-444.000.

Bicskei, Bela Joseph. Precision blocking of lens blanks. 4,077,722, Cl. 356-127.000.

Biehler, Jean-Marie J.: *See*—
Lecolier, Serge L.; and Biehler, Jean-Marie J., 4,077,964, Cl. 260-293.860.

Bier, Gerhard: *See*—
Vollkommer, Norbert; Richtzenhain, Hermann; Bier, Gerhard; and Gorlitz, Manfred, 4,078,148, Cl. 560-185.000.

Birnkraut, Hans-Walter: *See*—
Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, 4,078,003, Cl. 260-583.00P.

Bishop, Alfred A.; Weiss, Ernst H. G.; and Engel, Fred C., to Westinghouse Electric Corporation. Nuclear reactor with self-orificing radial blanket. 4,077,835, Cl. 176-18.000.

Bishop, Homer L. Method of making a magnetic flexible printing plate. 4,078,031, Cl. 264-163.000.

Bissell, Inc.: *See*—
Herrick, Wallace D.; and Yonkers, Robert A., 4,077,120, Cl. 30-43.500.

Bitterice, Michael G.; and Keslar, Leroy D., to PPG Industries, Inc. Lightweight window with heating circuit and anti-static circuit and a method for its preparation. 4,078,107, Cl. 428-38.000.

Blakeslee, Thomas R.; and Francy, James R., to Logisticon, Inc. Power steering device for lift truck. 4,077,486, Cl. 180-79.100.

Blechschmitt, Kurt; Reuter, Peter; Wirth, Friedrich; and Hornberger, Paul, to BASF Aktiengesellschaft. Manufacture of phthalic anhydride from o-xylene or naphthalene. 4,077,984, Cl. 260-346.400.

Bleck, Wolf-Eckhard; Nickel, Horst; and Kramer, Erich, to Bayer Aktiengesellschaft. Process for the preparation of concentrated solutions of urea compounds. 4,077,767, Cl. 8-85.00R.

Bleich, Simon. Apparatus for manufacturing and wrapping labels. 4,077,185, Cl. 53-123.000.

Blewett, Charles W.; and Garrett, William R., Jr., to Emery Industries, Inc. Olefin metathesis catalysts and process utilizing same. 4,078,012, Cl. 260-683.00D.

Blewett, Charles W.; and Garrett, William R., Jr., to Emery Industries, Inc. Olefin metathesis catalysts and process utilizing same. 4,078,013, Cl. 260-683.00D.

Bliss & Laughlin Industries, Incorporated: *See*—
Pinaire, Lon W.; and Godwin, Robert H., 4,077,596, Cl. 248-379.000.

Bloebaum, Roelof Karl: *See*—
van Heuven, Jan Willem; and Bloebaum, Roelof Karl, 4,077,885, Cl. 210-193.000.

Bloomquist, Arnold Eugene: *See*—
Lim, Sim Koei; Bloomquist, Arnold Eugene; and Schaper, Raymond Joseph, 4,077,930, Cl. 260-29.6TA.

Blum, Helmut; and Worms, Karl-Heinz, to Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA). Diphosphonoalkane carboxylic acids, process of preparation and methods of use. 4,077,997, Cl. 260-502.40P.

Blumental, Gunter: *See*—
Spies, Klaus; Blumental, Gunter; Bohnes, Karlheinz; and Marr, Peter, 4,077,670, Cl. 299-11.000.

Bochumer Eisenhutte Heintzmann GmbH & Co: *See*—
Spies, Klaus; Blumental, Gunter; Bohnes, Karlheinz; and Marr, Peter, 4,077,670, Cl. 299-11.000.

Bockelmann, Wilfried; and Faltermeier, Georg, to Societe Industrielle de Brevets et d'Etudes S.I.B.E. Carburetor for internal combustion engine. 4,078,024, Cl. 261-39.00B.

Bodig, Bernd: *See*—
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,377, Cl. 123-148.00S.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,379, Cl. 123-148.00S.

Boeing Company, The: *See*—
Ayyagari, Radhakrishna, 4,077,206, Cl. 60-262.000.
Bryan, Darold Ray, 4,077,532, Cl. 214-310.000.
Shorey, Thomas H., 4,077,590, Cl. 244-118.00R.

Boelens, Jacques Toussaint: *See*—
Meunier, Henry Gilbert; and Boelens, Jacques Toussaint, 4,078,262, Cl. 366-151.000.

Bohman, Carl E.: *See*—
Bennett, Clarence L., Jr.; Bohman, Carl E.; DeLorenzo, Joseph D.; and Wilhelmsen, Harald, 4,077,488, Cl. 180-98.000.

Bohme, Ekkehard: *See*—
Dolfini, Joseph Edward; and Bohme, Ekkehard, 4,077,967, Cl. 260-306.70C.

Bohnes, Karlheinz: *See*—
Spies, Klaus; Blumental, Gunter; Bohnes, Karlheinz; and Marr, Peter, 4,077,670, Cl. 299-11.000.

Bolgiano, D. Ridgely: *See*—
Benjamin, J. Malvern, Jr.; Bolgiano, D. Ridgely; and McHenry, Carl R., 4,077,402, Cl. 128-24.00R.

Bolt Vehicles, Incorporated: *See*—
Bonora, Anthony C.; and Holt, Thomas, 4,077,485, Cl. 180-68.500.

Bolza, Frederick; Jellinek, Thomas; Neill, Keith Gordon; and Tankey, Howard William. Gelled-water bearing explosive composition. 4,077,820, Cl. 149-109.400.

Bonis, Maurice, to U.S. Philips Corporation. Semiconductor device. 4,078,244, Cl. 357-46.000.

Bonora, Anthony C.; and Holt, Thomas, to Bolt Vehicles, Incorporated. Vehicle battery mounting apparatus. 4,077,485, Cl. 180-68.500.

Boothroyd, Rodney L.; Wedge, Thomas E.; and Aine, Harry E. Curved architectural structure of foam and cement. 4,077,177, Cl. 52-741.000.

Boquet, Jean Pierre Michel, to Bertin & Cie. Metal sheet conveyor with linear electric motor and ground-effect shoe. 4,077,507, Cl. 198-619.000.

Borcher, Thomas A.; and Knochel, John R., to Procter & Gamble Company, The. Apparatus for making variegated soap bars or cakes. 4,077,754, Cl. 425-131.100.

Borchers, Herbert H.: *See*—
Johnson, J. Walter; and Borchers, Herbert H., 4,078,245, Cl. 358-86.000.

Borden, Inc.: *See*—
Columbus, Peter Spiros, 4,077,932, Cl. 260-29.6TA.

Borlinghaus, Arthur, to Gebruder Ahle, Firma. Helical compression spring made of wire of circular cross section, especially for use in motor vehicles. 4,077,619, Cl. 267-166.000.

Boroschewski, Gerhard: *See*—
Arndt, Friedrich; and Boroschewski, Gerhard, 4,077,798, Cl. 71-100.000.

Borostyan, Stephen; Connolly, Douglas P.; and Friske, Alan D., to Xerox Corporation. Transfer charge control system. 4,077,709, Cl. 355-3.0TR.

Borst, Wolfgang, to Robert Bosch GmbH. Controlled frequency division frequency divider circuit. 4,078,203, Cl. 328-39.000.

Bost, Jonathan Robert, to Motorola, Inc. Piezoelectric bimorph or monomorph bender structure. 4,078,160, Cl. 179-110.00A.

Boston Gear Inc.: *See*—
Johnson, William J., 4,077,274, Cl. 74-425.000.

Botros, Radamis; and Lafrance, Conrad Damien, to Northern Telecom Limited. Telephone apparatus for use in a conference room. 4,078,155, Cl. 179-1.0CN.

Bottiglier, Elmer John: *See*—
Redmond, John Peter; Shirk, Albert; Bottiglier, Elmer John; and Zimmerman, Richard Henry, 4,078,096, Cl. 427-98.000.

Bouyoucos, John V., to Hydroacoustics Inc. Impact tools. 4,077,304, Cl. 91-276.000.

Bovio, Michele: *See*—
Giolitti, Nicolo; and Bovio, Michele, 4,077,505, Cl. 197-1.00R.

Bowden, Woodrow Raleigh; Hills, William H.; and Winner, Frank Edward, to Monsanto Company. Open end spinning. 4,077,197, Cl. 57-156.000.

Bowers, Alvin L.: *See*—
Spaude, Robin W.; and Bowers, Alvin L., 4,077,493, Cl. 184-105.00A.
Spaude, Robin W.; and Bowers, Alvin L., 4,077,494, Cl. 184-105.00A.

Boyce, W. David, Jr.; and Kearns, Donald E., to Ladd Tool Sales Co., Inc. Vertical flange clip and installation tool. 4,077,105, Cl. 29-278.000.

Boyle, Raymond W.: *See*—
Arnold, John L.; and Boyle, Raymond W., 4,077,901, Cl. 252-301.10W.

Bradford, George J., to International Telephone and Telegraph Corporation. Night setback-morning ready control system for unit ventilators. 4,077,566, Cl. 236-46.00C.

Bradfoss Anpartsselskab: *See*—
Brandtberg, Kai, 4,077,536, Cl. 215-228.000.

Bradner, Norman R., to Pfizer Inc. Hybridization of soybeans via the leaf-cutter bee. 4,077,157, Cl. 47-58.000.

Brahm, Harry. Apparatus for cutting expanded foam blocks to provide a predetermined surface configuration thereon. 4,077,301, Cl. 90-13.200.

Brailsford, Harrison D. Vacuum operated sampler. 4,077,263, Cl. 73-421.00B.

Branconi, Marcello, to Societa Italiana Macchine Industriali Torino, S.p.A. Hydraulic excavator equipment for excavation laterally of the excavator. 4,077,140, Cl. 37-103.000.

Brandenstein, Manfred: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.

Brandstatter, Wilhelm; Haschka, Gerhard; and Heindze, Herbert, to AGFA-Gevaert, A.G. Adhesive layer for X-ray intensifying screens on polyethylene terephthalate support layers. 4,078,108, Cl. 428-480.000.

Brandstrom, Arne Elof: *See*—
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Brandt Manufacturing, Inc.: *See*—
Brandt, Vernon, 4,077,654, Cl. 280-718.000.

Brandt, Vernon, to Brandt Manufacturing, Inc. Spring suspension. 4,077,654, Cl. 280-718.000.

Brandtberg, Kai, to Bradfoss Anpartsselskab. Bottle cap with removable plastic insert. 4,077,536, Cl. 215-228.000.

Brass Craft Manufacturing Company: *See*—
Karie, Earl K., 4,077,426, Cl. 137-454.600.

Braun, Oskar; Dobner, Reinhold; Overlach, Knud; and Pietzsch, Ludwig, to Pfaff Industriemaschinen G.m.b.H. Sewing machine having workpiece prepuncturing device. 4,077,340, Cl. 112-131.000.

Braun, Siegfried: *See*—
Czerwon, Dieter; Ruppel, Friedrich; and Braun, Siegfried, 4,078,033, Cl. 264-178.00R.

Braun, Wolfgang: *See*—
Schabert, Hans-Peter; Irion, Leonhard; and Braun, Wolfgang, 4,077,837, Cl. 176-38.000.

Bray, Donald Thedore, to Desalination Systems, Inc. Reverse osmosis system with automatic pressure relief valve. 4,077,883, Cl. 210-136.000.

Breckenridge, John R.: *See*—
Sieckert, Edgar W.; Frayseth, Robert D.; and Breckenridge, John R., 4,077,434, Cl. 138-92.000.

Brennan, Harry M.: *See*—
Bertolacini, Ralph J.; and Brennan, Harry M., 4,077,909, Cl. 252-455.00Z.

Brice, John C.: *See*—
Robertson, John M.; Brice, John C.; and Davies, John E., 4,077,832, Cl. 156-624.000.

Bridgestone Tire Company Limited: *See*—
Miyoshi, Isao; Abe, Masaru; Tezuka, Toshiro; and Yoshimoto, Toshio, 4,077,454, Cl. 152-354.00R.
Yukuta, Toshio; Ohashi, Takashi; and Arai, Katsuhiko, 4,077,920, Cl. 260-2.5AM.

Briel, Henry Christian, Jr.; and Sabo, Julius Alan, to Western Electric Co., Inc. Panel-mountable connector block assembly. 4,077,693, Cl. 339-126.00R.

Briggs, Ronald, to National Research Development Corporation. Optical density measurement. 4,077,724, Cl. 356-208.000.

Brinkley, Robie G.; and Welton, Gerry D., to said Robie G. Brinkley; by said Gerry D. Welton. Flow control means for compressed gas cylinders. 4,077,422, Cl. 137-68.00R.

Brinkmann, Ludwig: *See*—
Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, 4,078,003, Cl. 260-583.00P.

Broehl, Anton, to Lebus International, Inc. Chain stopper. 4,077,348, Cl. 114-200.000.

Brooks, Gerald Thomas, to National Research Development Corporation. Cyclodiene insecticides. 4,078,077, Cl. 424-285.000.

Brown, Donald Dean; and Culp, Jere Sanders, to Kelsey-Hayes Co. Mechanically actuated disk brake with servo action. 4,077,498, Cl. 188-72.200.

Brown, Edwin L.: *See*—
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.

Brown, Herbert C., to Aldrich-Boranes, Inc. Reduction of chemical compounds with 9-BBN. 4,078,002, Cl. 260-583.00K.

Brown, Jack T., to Westinghouse Electric Corporation. Energy density iron-silver battery. 4,078,125, Cl. 429-145.000.

Brown, Jerome D.; and Mansfield, John W., to Brown, Jerome D. Standpipe adapter for sink drains of varied diameter. 4,077,430, Cl. 137-593.000.

Brown & Williamson Tobacco Corporation: *See*—
Baker, Richard Roland; Green, Sydney James; and Kilburn, Keith Douglas, 4,077,414, Cl. 131-8.00R.

Bruning Company, The: *See*—
Maldavs, Ojars, 4,077,433, Cl. 137-614.040.

Bruntmyer, Joseph A. Aerodynamic toy. 4,077,155, Cl. 46-74.00R.

Bryan, Darold Ray, to Boeing Company, The. Airborne cargo container transporter and transfer system. 4,077,532, Cl. 214-310.000.

Bubeck, Gunther: *See*—
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.

Buchel, Franz, to Hilti Aktiengesellschaft. Latching arrangement for the firing pin in an explosive powder charge driven setting gun. 4,077,556, Cl. 227-8.000.

Buckle, Jon L. S.: *See*—
Arney, Donald B.; and Buckle, Jon L. S., 4,078,182, Cl. 307-10.0AT.

Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., to Egyt Gyogyszervegyeszeti Gyar. Novel oxime ethers. 4,077,999, Cl. 260-566.0AE.

Buehner, Joseph F., to Buehner, Joseph F., Trustee. Internal combustion engine valve stroke adjusting device and combination thereof with engine. 4,077,369, Cl. 123-90.160.

Buehner, Joseph F., Trustee: *See*—
Buehner, Joseph F., 4,077,369, Cl. 123-90.160.

Buelow, Carol: *See*—
Megahed, El Sayed; and Buelow, Carol, 4,078,127, Cl. 429-206.000.

Buffaloe, Malcolm E., to Microdot Inc. Wire advancing mechanism. 4,077,539, Cl. 221-237.000.

Buhrer, Erwin. Method and apparatus for the production of foundry molds. 4,077,459, Cl. 164-40.000.

Buhrer, Erwin. Apparatus for effecting simultaneous free-fall jolting and squeezing of foundry molds during production thereof. 4,077,461, Cl. 164-194.000.

Buildex, Inc.: *See*—
Sekerich, Michael, 4,077,677, Cl. 308-3.600.

Bukaitz, Finley M., to Kero Metal Products Co., Inc. Prefabricated metal storage cabinets. 4,077,686, Cl. 312-257.0SM.

Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, to Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France. Enamines, their derivatives and processes of production. 4,077,976, Cl. 260-326.200.

Bunegar, Frederick J.; and Tesch, Sheila A., to Minnesota Mining and Manufacturing Company. Wax-stripping cleaning composition. 4,077,896, Cl. 252-90.000.

Bunel, Jacques: *See*—
Talvard, Jean-Pierre; Flaceliere, Bernard; and Bunel, Jacques, 4,077,336, Cl. 101-93.050.

Bunnelle, Philip R., to FMC Corporation. Subterranean mining apparatus. 4,077,481, Cl. 175-232.000.

Bunnelle, Philip R., to FMC Corporation. Subterranean drilling and slurry mining method. 4,077,671, Cl. 299-17.000.

Burchenko, Jury Petrovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Burdick Corporation, The: *See*—
Partridge, Leslie W., 4,077,413, Cl. 128-419.00D.

Burenga, Thomas I., to TSC Industries, Inc. Portable air compressor. 4,077,747, Cl. 417-234.000.

Burke, Jerry Allen, Jr.; and Davoud, John Gordon. Condensing vapor heat engine with constant volume superheating and evaporating. 4,077,214, Cl. 60-512.000.

Burkhardt, Gisbert: *See*—
Frank, Werner; Jeschke, Henning; and Burkhardt, Gisbert, 4,077,620, Cl. 271-10.000.

Burkl, Erich: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.

Burman, Russell W., to AMAX, Inc. Process for "Black Fabrication" of molybdenum and molybdenum alloy wrought products. 4,077,811, Cl. 148-11.50F.

Burndy Corporation: *See*—
Feldberg, Leonard H., 4,077,689, Cl. 339-75.00M.

Burnell, Dennis G. A., to Chandler Evans Inc. Emergency metering valve and geometry actuator control device. 4,077,203, Cl. 60-39.270.

Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, to Hoffmann-La Roche Inc. 4-(O,O-Diester phosphoryloxy)cyclohex-4-en-1,2-carboxylic anhydrides. 4,077,985, Cl. 260-346.600.

Burroughs Wellcome Co.: *See*—
McHardy, Nicholas, 4,078,088, Cl. 424-331.000.

Burton, Bernard Lee: *See*—
Estep, Gordon J.; and Burton, Bernard Lee, 4,077,854, Cl. 204-37.00R.

Burton, Gilbert W.; and O'Farrell, Charles P., to Exxon Research & Engineering Co. Process for preparing a sulfonated and passivated low unsaturation elastomer cement. 4,077,933, Cl. 260-29.7EM.

Buser, Werner, to BBC Brown, Boveri & Company Limited. Oscillator circuit for generating a signal whose frequency is representative of the phase shift of a four terminal network. 4,078,201, Cl. 324-233.000.

Busso, Giuseppe, to Alfa Romeo S.p.A. Device for the automatic regulation of the tension of a crenellated timing belt. 4,077,272, Cl. 74-242.1FP.

Butler, Donald L. Receptacle carriage, dispenser and discharge device. 4,077,540, Cl. 221-297.000.

Butler, Michael James. Retractable castor mechanism. 4,077,086, Cl. 16-33.000.

Butterworth, George A. M.; and Elias, Robert T., to Johnson & John-

son. Disposable absorbent pad with non-woven facing. 4,077,410, Cl. 128-287.000.

Buyukliev, Georgi Stoykov: *See—*
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.

Byham, Geoffrey Malcolm: *See—*
Lowson, Martin Vincent; Hawkings, David Leonard; Byham, Geoffrey Malcolm; and Perry, Frederick John, 4,077,741, Cl. 416-228.000.

C. van der Lely N.V.: *See—*
van der Lely, Cornelis; and van der Lely, Ary, 4,077,477, Cl. 172-114.000.

Caldwell, Robert Joseph: *See—*
Cycowicz, Izchak; Caldwell, Robert Joseph; and Ueng, Ming-Shean, 4,077,663, Cl. 297-83.000.

Caleca, Vincent: *See—*
Phelps, James D. M.; McElroy, Alan J.; and Caleca, Vincent, 4,078,184, Cl. 307-147.000.

Calevro, Torino E.; and Hagedorn, Floyd T., to Libbey-Owens-Ford Company. Adjustable rack for supporting a glass sheet. 4,077,792, Cl. 65-288.000.

Calgon Corporation: *See—*
Lim, Sim Koei; Bloomquist, Arnold Eugene; and Schaper, Raymond Joseph, 4,077,930, Cl. 260-29.6TA.

Callegari, Stephen R.; Moncus, James D.; and Harper, Roland George, Jr., to Lamb Industries, Inc. Derrick mounted apparatus for the manipulation of pipe. 4,077,525, Cl. 214-2.500.

Camco, Incorporated: *See—*
Watkins, Fred E., 4,077,473, Cl. 166-323.000.

Campbell, Lloyd F. Manually operated mobile mixer. 4,078,263, Cl. 366-53.000.

Camphausen, Don L., to Xerox Corporation. Waveguide addressing and modulating method and apparatus. 4,077,700, Cl. 350-96.130.

Campioni, Armando, to Indesit Industria Elettrodomestici Italiana S.p.A. Transmitter selection circuit for a radio or television receiver. 4,078,213, Cl. 325-459.000.

Canada Square Management Ltd.: *See—*
Moog, Gerhard W.; and Cooper, Kenneth R., 4,077,464, Cl. 165-18.000.

Canon Kabushiki Kaisha: *See—*
Komori, Shigehiro; Hattori, Hiroyuki; Inuzuka, Tsuneki; and Miyamoto, Koichi, 4,077,714, Cl. 355-51.000.
Suzaki, Kuniyoshi, 4,077,705, Cl. 352-73.000.
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.

Cantini, Alfredo. Machine for the production of helical springs and for their introduction into hollow annular safety catches for necklaces. 4,077,099, Cl. 29-38.00C.

Canup, Robert E., to Texaco Inc. Controlled-duration continuous-wave high-frequency ignition system. 4,077,380, Cl. 123-148.00E.

Carey, Jesse. Fishing rod holder. 4,077,148, Cl. 43-16.000.

Carl Schleicher & Schull: *See—*
Kremer, Richard D., 4,077,875, Cl. 210-23.00F.

Carlo Erba S.p.A.: *See—*
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.

Carlson, Jeffrey Allen; Schwartz, Bradford Clyde; and Steving, Gerald, to International Business Machines Corporation. Diffusion bonding of crystals. 4,077,558, Cl. 228-121.000.

Carlson, Paul R.; and Carlson, Richard L., to Ground Hog, Inc. One man operated, twin wheel mounted powered earth drill. 4,077,480, Cl. 173-22.000.

Carlson, Richard L.: *See—*
Carlson, Paul R.; and Carlson, Richard L., 4,077,480, Cl. 173-22.000.

Carlsson, Enar Ingemar: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Carlsson, Stig Ake Ingemar: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Carn, Patrick. Wide elliptical tire having enlarged reinforcing structure at hub. 4,077,452, Cl. 152-327.000.

Carratala, Alfredo; and Palomino, Julio. Holder for a plant container. 4,077,593, Cl. 248-146.000.

Carrier Corporation: *See—*
Cochrane, W. Winston; Geary, Carl H.; and Fothergill, Derek, 4,077,743, Cl. 417-53.000.
McCabe, Frank J., Jr.; Coleman, Milton H.; and Herb, Carl C., 4,077,310, Cl. 98-40.00D.
Smith, Joseph W., 4,077,102, Cl. 29-252.000.
Watson, James J., Jr., 4,077,559, Cl. 228-154.000.

Carter, Coleman J.; and Leonard, Arden. Caulking gun holder. 4,077,595, Cl. 248-210.000.

Carter, James M.: *See—*
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.

Casterton, Robert Henry; and Wiegardt, Gordon K., to Deere & Company. Total power fluid system vehicle with steering control. 4,077,490, Cl. 180-143.000.

Caterpillar Tractor Co.: *See—*
Dezelan, Joseph E., 4,077,484, Cl. 180-44.00M.
Durham, Donald F., 4,077,634, Cl. 277-92.000.
Goloff, Alexander, 4,077,751, Cl. 418-270.000.
Hammond, James T., 4,077,283, Cl. 74-860.000.
Hickman, Donald A., Sr.; Hrabak, John H.; and Rosenberger, Paul C., 4,077,500, Cl. 188-106.00P.
Klett, Gene R.; and Richardson, Warner G., 4,077,142, Cl. 37-141.00R.
Staebler, Paul J., 4,077,302, Cl. 90-13.900.
Stedman, Robert N., 4,077,141, Cl. 37-117.500.
Wirt, Leon A., 4,077,445, Cl. 144-3.00D.

Cecil Equipment Company, The: *See—*
Zeewy, Abraham; and Geringer, Donald, 4,078,197, Cl. 318-626.000.

Celanese Corporation: *See—*
Costanza, John R.; and Collins, George L., 4,077,858, Cl. 204-159.230.
Costanza, John R.; Conciatori, Anthony B.; and Lazear, Nelson R., 4,077,859, Cl. 204-159.230.
Hughes, O. Richard, 4,077,906, Cl. 252-431.00C.
Kramer, Charles E., 4,078,016, Cl. 260-860.000.
Logwin, John R., 4,077,822, Cl. 156-157.000.

Cement Asbestos Products Company: *See—*
Wright, James, 4,077,577, Cl. 242-7.220.

Centre de Recherches Metallurgiques-Centrum voor Research de Metallurgie: *See—*
Meunier, Henry Gilbert; and Boelens, Jacques Toussaint, 4,078,262, Cl. 366-151.000.
Pirlet, Robert Alfred, 4,077,723, Cl. 356-163.000.

Ceskoslovensak akademie Ved: *See—*
Benes, Milan; and Peska, Jan, 4,077,963, Cl. 260-290.00V.

Chair-E-Yacht, Inc.: *See—*
Clark, Bobby Dean, 4,077,642, Cl. 280-43.200.

Chalaye, Jean-Philippe: *See—*
Pomot, Jean; and Chalaye, Jean-Philippe, 4,078,051, Cl. 424-35.000.

Chambers, R. William, to Deco Industries, Inc. Method for obtaining hydrocarbon products from coal and other carbonaceous materials. 4,077,868, Cl. 208-10.000.

Champion International Corporation: *See—*
Wright, John T., 4,077,823, Cl. 156-212.000.

Chandler Evans Inc.: *See—*
Burnell, Dennis G. A., 4,077,203, Cl. 60-39.270.
Fitzgerald, Robert Edward, 4,077,572, Cl. 239-265.170.

Chapin, Leo N.; and Rhee, Young, to A. B. Dick Company. Single color electrophotographic copy process. 4,077,802, Cl. 96-1.00R.

Chapron, Claude; and Kaire, Jean-Claude, to U.S. Philips Corporation. Device for supplying a regulated current. 4,078,199, Cl. 323-1.000.

Chase, Michael John, to Imperial Metal Industries (Kynoch) Limited. Energy absorber. 4,077,495, Cl. 188-1.00C.

Chatham Precision, Inc.: *See—*
Dussia, R. Jules, 4,077,606, Cl. 251-122.000.

Chauvel, Bernard; and Daniel, Jean-Claude, to Rhone-Progil. Graft polymers and compositions of high impact strength. 4,078,018, Cl. 260-880.00R.

Cheatham, Guy R.; and Fisher, Ralph W. Tennis racket with detachable handle. 4,077,627, Cl. 273-73.00R.

Chebatareva, Ekaterina Grigorievna: *See—*
Trofimov, Boris Alexandrovich; Atavin, Alexandr Spiridonovich; Mikhaleva, Albina Ivanovna; Kalabin, Gennady Alexandrovich; and Chebatareva, Ekaterina Grigorievna, 4,077,975, Cl. 260-319.100.

Chemetron Corporation: *See—*
Lindmark, Karl Lewis, 4,077,248, Cl. 72-389.000.

Chemische Werke Huels Aktiengesellschaft: *See—*
Diebel, Klaus; and Schroder, Manfred, 4,078,005, Cl. 260-614.00R.

Chen, Mark Chaoming, to Du Pont de Nemours, E. I., and Company. 5-Norbornene-2-methyl phosphites and phosphate. 4,078,022, Cl. 260-956.000.

Chen, Tien Chi; Eswaran, Kapali P.; Lum, Vincent Yu-Sun; and Tung, Chin, to International Business Machines Corporation. Apparatus for transposition sorting of equal length records in overlap relation with record loading and extraction. 4,078,260, Cl. 364-900.000.

Chen, Tze-Ning, to Ingersoll-Rand Company. Water distribution system for cooling water. 4,078,027, Cl. 261-116.000.

Cherry, David J.: *See—*
Cowell, George K.; and Cherry, David J., 4,077,948, Cl. 260-79.50R.

Chestney, James K., to Lawrence Peska Associates, Inc. Sea battle game apparatus. 4,077,629, Cl. 273-101.000.

Cheung, Nelson: *See—*
Lems, Peter; and Cheung, Nelson, 4,077,313, Cl. 100-2.000.

Chevron Research Company: *See—*
Lavigne, Joe B., 4,078,144, Cl. 560-126.000.
Wedel, Carroll J., 4,077,940, Cl. 260-45.70P.

Chino, Kenichi: *See—*
Kitamura, Ko; Watanabe, Mamoru; Iwamura, Kimihiko; and Chino, Kenichi, 4,078,166, Cl. 219-216.000.

Chirico, Anthony Nicholas, to Ecodyne Corporation. Liquid-gas separation apparatus. 4,077,786, Cl. 55-185.000.
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., to Occidental Petroleum Corporation. Solid waste disposal system. 4,077,847, Cl. 201-21.000.
Cholet, Jean, to Texas Instruments Incorporated. Slaved pressure transducer. 4,077,262, Cl. 73-701.000.
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, to Merck & Co., Inc. 3-(β-Aminoethylidene)-7-oxo-4-oxaazabicyclo[3.2.0]heptane-2-carboxylic acid and derivatives thereof. 4,078,067, Cl. 424-272.000.
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, to Merck & Co., Inc. 3-(β-Aminoethylidene)-6-(α-hydroxyethyl)-7-oxo-4-oxaazabicyclo[3.2.0]heptane-2-carboxylic acid and derivatives thereof. 4,078,068, Cl. 424-272.000.
Christian, Francis R. Casket handle structure. 4,077,096, Cl. 27-2.000.
Christmann, Norbert. Paper hanging trimming tool. 4,077,124, Cl. 30-287.000.
Chu, Ting L., to United States of America, National Aeronautics and Space Administration. Process for utilizing low-cost graphite substrates for polycrystalline solar cells. 4,077,818, Cl. 148-174.000.
Church, Peter K.; and Knutson, Oliver J., to Kaman Sciences Corporation. Chromia-bonded refractory body devoid of vitreous and sintered bonding. 4,077,808, Cl. 106-40.00R.
Ciaudelli, Joseph P.: *See*—
Isermann, Howard P.; and Ciaudelli, Joseph P., 4,078,054, Cl. 424-60.000.
Ciba-Geigy Corporation: *See*—
Beriger, Ernst, 4,078,075, Cl. 424-281.000.
Cowell, George K.; and Cherry, David J., 4,077,948, Cl. 260-79.50R.
McCrae, James McGeachie; and Midcalf, Christopher, 4,077,953, Cl. 260-149.000.
Moser, Paul; and Rody, Jean, 4,077,902, Cl. 252-400.00A.
Rose, Rod A.; and Fritz, Andre, 4,078,020, Cl. 260-897.00A.
Stephen, John F.; and Spivack, John D., 4,077,941, Cl. 260-45.75N.
Vlattas, Isidoros, 4,077,979, Cl. 260-332.100.
Vlattas, Isidoros, 4,077,980, Cl. 260-332.20A.
Ciganek, Engelbert, to Du Pont de Nemours, E. I., and Company. Ethenoanthracenes. 4,077,977, Cl. 260-326.100.
Clark, Bobby Dean, to Chair-E-Yacht, Inc. Movable bed trailer. 4,077,642, Cl. 280-43.200.
Clark, Frank T., Jr., to Tantera, Inc. Method of making a sponge mop part. 4,077,672, Cl. 300-21.000.
Clarke, William A. Pneumatic cushion toy. 4,077,625, Cl. 272-116.000.
Claro Laboratories, Inc.: *See*—
Heaton, George N., 4,077,512, Cl. 206-45.200.
Clausell, Joseph. Exercising game apparatus. 4,077,623, Cl. 272-61.000.
Clearman, Jack F.: *See*—
Platt, Clark I.; and Clearman, Jack F., 4,077,239, Cl. 68-53.000.
Clemence, Francois; Humbert, Daniel; and Fournex, Robert, to Roussel UCLAF. Novel p-(4-tetrahydropyranyl)-phenoxy-compounds. 4,078,076, Cl. 424-283.000.
Coach and Car Equipment Corporation: *See*—
Harder, Arthur J., Jr., 4,077,664, Cl. 297-183.000.
Coast Catamaran Corporation: *See*—
Arce, Henry Leyva, 4,077,347, Cl. 114-108.000.
Coastcom, Inc.: *See*—
Johnson, J. Walter; and Borchers, Herbert H., 4,078,245, Cl. 358-86.000.
Cobaugh, Robert Franklin; and Coller, James Ray, to AMP Incorporated. Zero force connector for circuit boards. 4,077,688, Cl. 339-74.00R.
Cobaugh, Robert Franklin; and Coller, James Ray, to AMP Incorporated. Circuit board connector. 4,077,694, Cl. 339-176.0MP.
Cochrane, W. Winston; Geary, Carl H.; and Fothergill, Derek, to Carrier Corporation. Compression machinery method and apparatus. 4,077,743, Cl. 417-53.000.
Cohen, M. Roy; Arrington, Bruce W.; and Pittendreigh, William W. Locking arrangement. 4,077,241, Cl. 70-371.000.
Cohen, Wilfred. Quickly erected back pack tent. 4,077,418, Cl. 135-4.00R.
Colbers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, to Hercules Incorporated. Synthesis of metal phthalocyanines. 4,077,973, Cl. 260-314.500.
Cole, Eugene E. Guiding assembly for a portable power tool. 4,077,292, Cl. 83-745.000.
Cole, Robert, to Albright & Wilson Ltd. Flameproofing of textiles. 4,078,101, Cl. 427-341.000.
Coleman, Milton H.: *See*—
McCabe, Frank J., Jr.; Coleman, Milton H.; and Herb, Carl C., 4,077,310, Cl. 98-40.00D.
Coll-Palagos, Miguel, to Stauffer Chemical Company. Method of metallizing materials. 4,077,853, Cl. 204-20.000.
Coller, James Ray; and Shannon, Suel Grant, to AMP Incorporated. Solder resist applying machine. 4,077,443, Cl. 141-111.000.
Coller, James Ray: *See*—
Cobaugh, Robert Franklin; and Coller, James Ray, 4,077,688, Cl. 339-74.00R.
Cobaugh, Robert Franklin; and Coller, James Ray, 4,077,694, Cl. 339-176.0MP.
Collins, George L.: *See*—
Costanza, John R.; and Collins, George L., 4,077,858, Cl. 204-159.230.
Collins, James D.: *See*—
Hodgson, Alfred W.; and Collins, James D., 4,078,218, Cl. 335-128.000.
Columbia Ribbon & Carbon Mfg. Co., Inc.: *See*—
Seleski, Richard C.; Peterson, Glenn E.; and Schoenlein, William J., 4,077,579, Cl. 242-57.100.
Columbus, Peter Spiros, to Borden, Inc. Acrylate adhesive aqueous dispersions. 4,077,932, Cl. 260-29.6TA.
Combastet, Michel. Torque converter. 4,077,278, Cl. 74-682.000.
Combes, Marvin G., to Grove Valve and Regulator Company. Cylindrical gate valve body. 4,077,604, Cl. 251-329.000.
Combustion Equipment Associates, Inc.: *See*—
Nadkarni, Ravindra M., 4,078,048, Cl. 423-571.000.
Commissariat a l'Energie Atomique: *See*—
Aubert, Roger, 4,077,840, Cl. 176-87.000.
Compagnie Generale des Etablissements Michelin: *See*—
de Zarauz, Yves, 4,078,131, Cl. 526-20.000.
Compagnie Industrielle des Piles Electroniques "CIPEL": *See*—
Lechevallier, Claude, 4,078,126, Cl. 429-166.000.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme): *See*—
Berthoux, Jean Louis; and Langrenne, Albert, 4,078,246, Cl. 360-133.000.
Comptoir Lyon-Alemand-Louyot: *See*—
Lacroix, Roger; Wacker, Manfred; and Lambert, Claude, 4,077,775, Cl. 23-254.00E.
Compton, Thomas A.: *See*—
Thornton, John A.; and Compton, Thomas A., 4,078,103, Cl. 427-349.000.
Conciatori, Anthony B.: *See*—
Costanza, John R.; Conciatori, Anthony B.; and Lazear, Nelson R., 4,077,859, Cl. 204-159.230.
Conley, Robert F. Method removing radioactivity from kaolin. 4,077,874, Cl. 209-5.000.
Connolly, Douglas P.: *See*—
Borostyan, Stephen; Connolly, Douglas P.; and Friske, Alan D., 4,077,709, Cl. 355-3.0TR.
Container Corporation of America: *See*—
Gardner, Jeffrey M., 4,077,561, Cl. 229-42.000.
Continental Can Company, Inc.: *See*—
Kulikowski, Donald F.; Richie, Kenneth E.; and Pan, Peter N. Y., 4,077,543, Cl. 222-95.000.
Continental Group, Inc., The: *See*—
Saumsiegle, Robert W.; and Harry, Ieuan L., 4,077,759, Cl. 425-451.000.
Continental Oil Company: *See*—
Leach, Bruce E., 4,078,042, Cl. 423-329.000.
Contraves AG: *See*—
Stutz, Theo; and Zemp, Georg, 4,077,252, Cl. 73-59.000.
Cook, William H., Jr. Machine for continuous glass filament winding of large bonded fiberglass structures, such as cryogenic tanks for liquid natural gas. 4,077,576, Cl. 242-3.000.
Cooke, Anson Richard; and Starke, George Robert, to Union Carbide Corporation. Method for inhibiting the growth of tobacco suckers. 4,077,795, Cl. 71-78.000.
Cooke-Yarborough, Edmund Harry, to United Kingdom Atomic Energy Authority. Stirling cycle thermal devices. 4,077,216, Cl. 60-520.000.
Coone, Malcolm G., to Lynes, Inc. Method and apparatus for grouting an offshore structure. 4,077,224, Cl. 61-94.000.
Cooper, Barry John: *See*—
Acres, Gary James Keith; and Cooper, Barry John, 4,077,913, Cl. 252-462.000.
Cooper, Kenneth R.: *See*—
Moog, Gerhard W.; and Cooper, Kenneth R., 4,077,464, Cl. 165-18.000.
Cooper, Thomas A.: *See*—
Agent, J. Richard; Nielsen, Donald W.; and Cooper, Thomas A., 4,077,180, Cl. 53-37.000.
Corbett, William H.: *See*—
Lewis, Kim R.; and Corbett, William H., 4,077,581, Cl. 242-67.30R.
Cordell, Geoffrey A.: *See*—
Farnsworth, Norman R.; Cordell, Geoffrey A.; and Ogura, Masaru, 4,078,145, Cl. 560-126.000.
Cornwell, Charles E.: *See*—
Plunguian, Mark; and Cornwell, Charles E., 4,077,809, Cl. 106-88.000.
Corson, Frederick P.: *See*—
Stevens, Violete L.; Sexton, Arthur R.; and Corson, Frederick P., 4,077,991, Cl. 260-407.000.
Corte, Herbert; Heller, Harold; and Netz, Otto, to Bayer Aktiengesellschaft. Process for the preparation of anion exchangers by aminoalkylation of crosslinked aromatic polymer using sulphur trioxide catalyst. 4,077,918, Cl. 260-2.10E.
Cortellino, Charles A., to International Business Machines Corporation. High energy radiation exposed positive resist mask process. 4,078,098, Cl. 427-43.000.
Cory, Cynthia S., executor: *See*—
Cory, Robert Paul, deceased; and Cory, Cynthia S., executor, 4,077,842, Cl. 195-63.000.
Cory, Robert Paul, deceased; and by Cory, Cynthia S., executor. Stabilized glucose isomerase enzyme concentrate. 4,077,842, Cl. 195-63.000.
Costanza, John R.; and Collins, George L., to Celanese Corporation. Completely polymerized ultraviolet cured coatings. 4,077,858, Cl. 204-159.230.

Costanza, John R.; Conciatori, Anthony B.; and Lazear, Nelson R., to Celanese Corporation. Polyunsaturated halogenated monomers for use in ultraviolet coating systems. 4,077,859, Cl. 204-159.230.

Costenoble, Ullrich, to Varta Batterie Aktiengesellschaft. Spiral-wrapped multi-layer cell separator. 4,078,123, Cl. 429-141.000.

Coulter Electronics, Inc.: *See*—
Hogg, Walter R., 4,077,749, Cl. 417-321.000.
Longman, Millard D., Jr., 4,078,211, Cl. 324-71.0CP.

County of Parkland No. 31: *See*—
Fagervold, Leroy W.; Solomon, Irwin J.; Webber, Edward; and Troudt, Jacob, 4,077,139, Cl. 37-41.000.

Coussens, Eugene C.: *See*—
Schoenfeld, Simon L.; and Coussens, Eugene C., 4,078,252, Cl. 364-858.000.

Cowell, George K.; and Cherry, David J., to Ciba-Geigy Corporation. Metal deactivators as adhesion promotors for vulcanizable elastomers to metals. 4,077,948, Cl. 260-79.50R.

Crasnianski, Serge, to I S A S.a.r.l. Cylinder lock. 4,077,240, Cl. 70-360.000.

Crites, Edmond W. Grass trimmer. 4,077,190, Cl. 56-12.700.

Crochet, Gerald J., Sr. Coupling apparatus. 4,077,234, Cl. 64-17.00R.

Cromie, Harry W.; Fitzgerald, James A.; Kopp, Clinton V.; and Washington, Freddie L., to Baxter Travenol Laboratories, Inc. Machine for winding hollow filaments. 4,077,578, Cl. 242-18.00G.

Crowle, Brian, to RCA Corporation. Differential amplifier. 4,078,206, Cl. 330-253.000.

Csizi, Gotthard: *See*—
Habermann, Wolfgang; Stockburger, Dieter; Thoma, Peter; and Csizi, Gotthard, 4,077,856, Cl. 204-149.000.

Cuccolo, Sergio: *See*—
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,078,140, Cl. 536-84.000.

Culp, Jere Sanders: *See*—
Brown, Donald Dean; and Culp, Jere Sanders, 4,077,498, Cl. 188-72.200.

Cunningham, Dean; Goeckner, Ralph; Alwardt, Marlin; and Wohltman, Leon, to Fedders Corporation. Device for forming finned heat transfer tubes. 4,077,116, Cl. 29-727.000.

Curtiss, Walter W., Jr.; and Forney, Joseph M., to Goodyear Tire & Rubber Company, The. Radial ply pneumatic tire and rim assembly. 4,077,455, Cl. 354 R-.

Cycowicz, Izchak; Caldwell, Robert Joseph; and Ueng, Ming-Shean, to Mohasco Corporation. Recliner loungers. 4,077,663, Cl. 297-83.000.

Czerwon, Dieter; Ruppel, Friedrich; and Braun, Siegfried, to Barmag Barmer Maschinenfabrik Aktiengellschaft. Processes and apparatus for liquid bath cooling of extruded foils. 4,078,033, Cl. 264-178.00R.

Daimler-Benz Aktiengesellschaft: *See*—
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.
Hornig, Rudolf; Beeskow, Bruno; and Worner, Gunter, 4,077,233, Cl. 64-11.00R.
Thoma, Frank, 4,077,376, Cl. 123-139.0DP.
Willmann, Karl; and Saufferer, Helmut, 4,077,374, Cl. 123-119.00E.

Daimon, Nobutoshi; Izawa, Toichiro; and Imai, Motoyuki, to Imai, Motoyuki. Sol of ultra-fine particles of layered structure material. 4,077,938, Cl. 260-37.0SB.

Dale, James A.; and Ng, Steve Y. W., to Dynapol. Polymeric N-substituted maleimide antioxidants. 4,078,091, Cl. 426-545.000.

Dale Weaver, Inc.: *See*—
Weaver, Dale L., 4,077,428, Cl. 137-567.000.

Dalziel, Warren L., to Shugart Associates. Apparatus having inwardly biased fingers hingedly attached to a hub for clamping and driving a flexible disc. 4,077,236, Cl. 64-22.000.

Dane, Burlie Newton, to Weatherford/Lamb, Inc. Well centralizer and method of making. 4,077,470, Cl. 166-244.00R.

Daniel, Jean-Claude: *See*—
Chauvel, Bernard; and Daniel, Jean-Claude, 4,078,018, Cl. 260-880.00R.

Dare Products, Incorporated: *See*—
Wilson, Robert M., 4,077,611, Cl. 256-10.000.

Dart Industries: *See*—
Honacker, Horst, 4,077,783, Cl. 55-146.000.

Daugherty, Charles W.: *See*—
Ellis, William Garrettson; Heavner, Paul William, Jr.; and Daugherty, Charles W., 4,077,397, Cl. 128-2.06E.

Daugherty, Roger H.; and Swensrud, Roger L., to Westinghouse Electric Corporation. Liquid-cooled stud for terminal bushings of a generator. 4,078,150, Cl. 174-15.0BH.

Davidson, Clara A., executrix: *See*—
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.

Davidson, David M., deceased: *See*—
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.

Davidson, William E.: *See*—
Walker, Wendell C.; Davidson, William E.; and Toft, Kaj, 4,077,143, Cl. 38-77.830.

Davies, John E.: *See*—
Robertson, John M.; Brice, John C.; and Davies, John E., 4,077,832, Cl. 156-624.000.

Davies, William Grenville; and Beedle, Howard Victor Andrew, to Associated Portland Cement Manufacturers Limited, The. Siloxanes. 4,077,994, Cl. 260-448.20E.

Davis, George B., Jr. Manufacturing apparatus for fabricating a disposable crust rolling form. 4,077,307, Cl. 93-18.000.

Davis, Kenneth L.: *See*—
Folen, Vincent J.; Vittoria, Carmine; Webb, Denis C.; and Davis, Kenneth L., 4,078,186, Cl. 310-313.000.

Davoud, John Gordon: *See*—
Burke, Jerry Allen, Jr.; and Davoud, John Gordon, 4,077,214, Cl. 60-512.000.

De La Moneda, Francisco H.: *See*—
De Bar, David E.; and De La Moneda, Francisco H., 4,078,243, Cl. 357-32.000.

De Bar, David E.; and De La Moneda, Francisco H., to International Business Machines Corporation. Phototransistor array having uniform current response and method of manufacture. 4,078,243, Cl. 357-32.000.

Deco Industries, Inc.: *See*—
Chambers, R. William, 4,077,868, Cl. 208-10.000.

DeCoster, James W. Concrete panel making apparatus. 4,077,757, Cl. 425-218.000.

Deere & Company: *See*—
Casterton, Robert Henry; and Wiegardt, Gordon K., 4,077,490, Cl. 180-143.000.
Kress, James Henry; and Michael, Richard Arlo, 4,077,280, Cl. 74-760.000.
Kress, James Henry, 4,077,282, Cl. 74-760.000.
Meiers, Gerald Franklyn, 4,077,315, Cl. 100-88.000.
Michael, Richard Arlo, 4,077,281, Cl. 74-760.000.
Redman, Andrew Paul; and Schulte, Gary Lee, 4,077,446, Cl. 144-34.00E.
Steinbach, James Gerald; Rehn, Gary Allen; and Jackson, William Wayne, 4,077,651, Cl. 280-426.000.
Thompson, Warren Lynn; and Kurt, Lynn Edward, 4,077,447, Cl. 144-34.00E.

Deines, Siegmund, to Teledyne Industries, Inc. Fluid-flow pulsator. 4,077,569, Cl. 239-101.000.

de Leaumont, Jean, to Le Ciment Arme Demay Freres. Construction element in particular for towers, silos or the like. 4,077,174, Cl. 52-259.000.

Della Torre, Arturo: *See*—
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.

DeLorenzo, Joseph D.: *See*—
Bennett, Clarence L., Jr.; Bohman, Carl E.; DeLorenzo, Joseph D.; and Wilhelmsen, Harald, 4,077,488, Cl. 180-98.000.

Del Pino, Fernando: *See*—
Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, 4,077,900, Cl. 252-299.000.

Demoiseau, Bernard. Method and installation for continuous combustion of combustibles. 4,077,337, Cl. 110-235.000.

Denver Wood Products Co.: *See*—
Miller, Robert M., 4,077,104, Cl. 29-271.000.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. Amino derivatives of 1,2,3,4-tetrahydro-2-oxopyrido[2,2-b]-pyrazine carboxylic acids and esters. 4,077,955, Cl. 260-250.0BC.

Denzel, Theodor; and Hoehn, Hans, to E. R. Squibb & Sons, Inc. 8H-Pyrazolo[4',3':5,6]pyrido[3,4-e][1,2,4]triazolo[1,5-a]pyrimidines. 4,078,064, Cl. 424-251.000.

DePaola, Paul F., to Forsyth Dental Infirmary for Children. High-concentration fluoride preparations and use for preventing caries. 4,078,053, Cl. 424-52.000.

Depew, Noel: *See*—
Koll, Laurel A.; and Depew, Noel, 4,077,073, Cl. 5-81.00R.

de Putter, Warner Jan, to de Putter, Warner Jan. Device for deforming hollow sections. 4,077,758, Cl. 425-387.100.

Dersarkisyan, Avedis Mardik: *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Desalination Systems, Inc.: *See*—
Bray, Donald Thedore, 4,077,883, Cl. 210-136.000.

Detroit Gasket Company: *See*—
Doerfling, Ralph G., 4,077,821, Cl. 156-79.000.
Doerfling, Ralph G., 4,078,100, Cl. 427-314.000.

de Zarauz, Yves, to Compagnie Generale des Etablissements Michelin. Ept elastomers. 4,078,131, Cl. 526-20.000.

Dezelan, Joseph E., to Caterpillar Tractor Co. Hydro-electrical priority valve and speed control circuit. 4,077,484, Cl. 180-44.00M.

Dezura, Waldo. Shower bath curtain holder. 4,077,072, Cl. 4-149.000.

Dhami, Kewal Singh: *See*—
Aronoff, Elihu J.; and Dhami, Kewal Singh, 4,078,114, Cl. 428-379.000.

Dick, David Cochrane; and Bauer, Fred, to General Electric Company. Cutting tool and insert assembly. 4,077,735, Cl. 407-89.000.

Dick, George M. Adjustable pinch clamp. 4,077,601, Cl. 251-9.000.

Diebel, Klaus; and Schroder, Manfred, to Chemische Werke Huels Aktiengesellschaft. Process for the production of alkoxytetrabromoctanes. 4,078,005, Cl. 260-614.00R.

Dietiker, Hans A.: *See*—
Vrana, Miroslav, 4,077,166, Cl. 51-420.000.

Diggs, Richard E. Fruit and nut harvester. 4,077,193, Cl. 56-328.00R.

Di Marco, Aurelia: *See*—
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and Di Marco, Aurelia, 4,077,988, Cl. 260-376.000.

Display Corporation International: *See*—
Nasgowitz, Donald D., 4,077,146, Cl. 40-564.000.
Dobner, Reinhold: *See*—
Braun, Oskar; Dobner, Reinhold; Overlach, Knud; and Pietzsch, Ludwig, 4,077,340, Cl. 112-131.000.
Dobrokhotova, Marina Konstantinovna: *See*—
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.
Dr. Kern GmbH: *See*—
Mader, Helmut, 4,078,181, Cl. 250-495.000.
Doerfling, Ralph G., to Detroit Gasket Company. Method of forming foam laminate and headliners. 4,077,821, Cl. 156-79.000.
Doerfling, Ralph G., to Detroit Gasket Company. Composite foam laminate and method. 4,078,100, Cl. 427-314.000.
Dolfini, Joseph Edward; and Bohme, Ekkehard, to E. R. Squibb & Sons, Inc. 6-Substituted penicillanic acid and derivatives thereof. 4,077,967, Cl. 260-306.70C.
Dolhyj, Serge R.; and Milberger, Ernest C., to Standard Oil Company. Catalysts useful for exothermic reactions. 4,077,912, Cl. 252-461.000.
Dollinger, Robert E.; Wright, Clinton M.; and Ruble, Theodore A., deceased (by Ruble, Eulalia Berry, executrix), to Sid Richardson Carbon & Gasoline Co. Carbon black reactor with axial flow burner. 4,077,761, Cl. 431-8.000.
Donnard, Reed E.; and Hirsekorn, Edward R. Underwater side arm. 4,077,147, Cl. 42-1.00L.
Donoghue, Robert J. Measuring and dispensing apparatus. 4,077,547, Cl. 222-207.000.
Dorner, Karl-Heinz: *See*—
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Dortch, Charles W.; and Vaught, Donald K., to Ballas, George C., Sr. Trailer assembly and connector unit therefore. 4,077,645, Cl. 280-204.000.
Doshi, Kishore Jasraj, to Union Carbide Corporation. Recovery of hydrogen and nitrogen from ammonia plant purge gas. 4,077,780, Cl. 55-26.000.
Doto, Shigeaki, to Nippon Air Brake Co., Ltd., The. Linearly operative electric/fluid pressure valve device. 4,077,674, Cl. 303-40.000.
Dow Chemical Company, The: *See*—
Stevens, Violete L.; Sexton, Arthur R.; and Corson, Frederick P., 4,077,991, Cl. 260-407.000.
Wagner, Eugene R.; and Mueller, Larry G., 4,078,084, Cl. 424-324.000.
Dragerwerk Aktiengesellschaft: *See*—
Moller, Hans; and Mussmann, Bernd, 4,077,776, Cl. 23-254.00R.
Dreyfus, Gerard: *See*—
Lewiner, Jacques; and Dreyfus, Gerard, 4,078,183, Cl. 307-112.000.
Driver, Michael C.; and Kim, He B., to Westinghouse Electric Corporation. Self-aligned gate field effect transistor and method for making same. 4,077,111, Cl. 29-571.000.
Drori, Mordeki. Fuel saving system for automobiles. 4,077,371, Cl. 123-106.000.
Drori, Mordeki. Fluid flow control devices. 4,077,425, Cl. 137-219.000.
Drumm, Arthur E. Sweeper brush section. 4,077,081, Cl. 15-181.000.
Drummond, James E.; Mondelli, Alfred A.; and Kolb, Alan C., to Maxwell Laboratories, Inc. Collector for electrostatic precipitator apparatus. 4,077,782, Cl. 55-139.000.
DSO "Cherna Metalurgia": *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.
Duerr, Joseph W., to Ganz Brothers, Inc. Shrink wrap package with tear strip. 4,077,516, Cl. 206-602.000.
Dugan, William P.: *See*—
Vanderveer, Ramon D.; and Dugan, William P., 4,077,864, Cl. 204-285.000.
Duliba, Paul, to National Forge Company. Method of and apparatus for machining a contoured surface. 4,077,285, Cl. 82-1.00C.
Dunbar, George W.; and Krumholz, Jerrold J., to Klisan, Inc. Child's play block with card-retaining tangs. 4,077,153, Cl. 46-24.000.
Dunlap, Thomas F.: *See*—
Reams, Lowell A.; Dunlap, Thomas F.; and Fenzan, Robert K., 4,077,215, Cl. 60-517.000.
Dunlop, Alfred Norman, to SCM (Canada) Limited. Solid paints coated substrates. 4,078,116, Cl. 428-431.000.
Dunlop Holdings Limited: *See*—
French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, 4,077,453, Cl. 152-330.00L.
Du Pont de Nemours, E. I., and Company: *See*—
Chen, Mark Chaoming, 4,078,022, Cl. 260-956.000.
Ciganek, Engelbert, 4,077,977, Cl. 260-326.100.
Gavin, John Henry, 4,077,117, Cl. 29-739.000.
Kremer, Fontaine Theodore, Jr.; and Ramsey, Harold Eugene, 4,077,184, Cl. 53-112.00A.
Lewis, Gary Brett, 4,078,034, Cl. 264-181.000.
Malik, Abdul-Ilah; and Most, Elmer Edwin, 4,078,143, Cl. 560-78.000.
Ripka, William Charles, 4,077,954, Cl. 260-289.00D.
Robinson, Larry Grant, 4,077,929, Cl. 260-29.6AQ.
Starkweather, Howard Warner, Jr.; and Mutz, Michael Joseph, 4,078,014, Cl. 260-857.00L.
Durant, Thomas O. Portable vise. 4,077,618, Cl. 269-130.000.
Durham, Donald F., to Caterpillar Tractor Co. Pressure balanced metal to metal seal. 4,077,634, Cl. 277-92.000.
Durst Ag. Fabrik Fototechnischer: *See*—
Gandini, Mario, 4,077,716, Cl. 355-67.000.
Dussia, R. Jules, to Chatham Precision, Inc. Flow control valve. 4,077,606, Cl. 251-122.000.
Dutaud, Theodore Gregoire. Process and apparatus for meat deboning. 4,077,089, Cl. 17-1.00G.
Duthion, Louis: *See*—
Fardeau, Michel; Duthion, Louis; and Volat, Jean-Pierre, 4,077,322, Cl. 101-129.000.
Dutton, Daniel Ronan: *See*—
Langdon, William Keith; and Dutton, Daniel Ronan, 4,077,894, Cl. 252-76.000.
Langdon, William Keith; and Dutton, Daniel Ronan, 4,077,895, Cl. 252-76.000.
Dynamit Nobel Aktiengesellschaft: *See*—
Vollkommer, Norbert; Richtzenhain, Hermann; Bier, Gerhard; and Gorlitz, Manfred, 4,078,148, Cl. 560-185.000.
Dynapol: *See*—
Dale, James A.; and Ng, Steve Y. W., 4,078,091, Cl. 426-545.000.
Dyott, Richard Burnaby; and Stevenson, John Leslie, to Post Office, The. Optical devices. 4,077,699, Cl. 350-96.340.
E. R. Squibb & Sons, Inc.: *See*—
Denzel, Theodor; and Hoehn, Hans, 4,077,955, Cl. 260-250.0BC.
Denzel, Theodor; and Hoehn, Hans, 4,078,064, Cl. 424-251.000.
Dolfini, Joseph Edward; and Bohme, Ekkehard, 4,077,967, Cl. 260-306.70C.
Hauck, Frederic Peter; and Sundeen, Joseph E., 4,078,066, Cl. 424-266.000.
Krapcho, John, 4,078,062, Cl. 424-246.000.
Treuner, Uwe D., 4,077,956, Cl. 260-250.0BC.
Wade, Peter C.; and Vogt, Berthold Richard, 4,077,958, Cl. 260-268.0TR.
Eardley, Edward Paul: *See*—
Halvorson, Thomas Gilbert; and Eardley, Edward Paul, 4,077,338, Cl. 110-235.000.
Eastman Kodak Company: *See*—
Ward, John William; and Leinbach, Richard Klein, 4,077,710, Cl. 355-3.00R.
Eaton Corporation: *See*—
Goscenski, Edward J., Jr., 4,077,279, Cl. 74-711.000.
Ebel, Igor Alexandrovich: *See*—
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.
Eberlin, Helmut: *See*—
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Ecodyne Corporation: *See*—
Chirico, Anthony Nicholas, 4,077,786, Cl. 55-185.000.
Economics Laboratory, Inc.: *See*—
Rue, Larry M., 4,077,898, Cl. 252-106.000.
Eder, Ulrich: *See*—
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,077,996, Cl. 260-464.000.
Edgington, Donald C.; and Edgington, William E. Graphic arts film dryer. 4,077,137, Cl. 34-70.000.
Edgington, William E.: *See*—
Edgington, Donald C.; and Edgington, William E., 4,077,137, Cl. 34-70.000.
Edmisten, John H. Apparatus for identifying the load characteristics of a centerfire firearm cartridge. 4,077,319, Cl. 101-41.000.
Edwards Engineering Corporation: *See*—
Edwards, Ray C., 4,077,789, Cl. 62-54.000.
Edwards, Ray C., to Edwards Engineering Corporation. Vapor condensing and recovery assembly including a decanter for vapor recovery system. 4,077,789, Cl. 62-54.000.
Edwards, Reginald Harold: *See*—
French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, 4,077,453, Cl. 152-330.00L.
EerNisse, Errol P.; Land, Cecil E.; and Snelling, Jay B., to United States of America, Energy. Input apparatus for dynamic signature verification systems. 4,078,226, Cl. 340-146.3SY.
Egbers, Gerhard: *See*—
Artzt, Peter; Bauer, Herbert; Egbers, Gerhard; and Tabibi, Sohrab, 4,078,231, Cl. 340-259.000.
Egyt Gyogyszervegyeszeti Gyar: *See*—
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.
Ehlers, Karl: *See*—
Wieking, Hans Wilhelm; and Ehlers, Karl, 4,077,799, Cl. 75-71.000.
Ehret, Gordon F.; Rowley, William N.; and Williams, Robert R., to Wylain, Inc. Liquid distributor valve assembly. 4,077,424, Cl. 137-119.000.
Eidenschink, Rudolf: *See*—
Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, 4,077,900, Cl. 252-299.000.

Einerhand, Johan Jozef: *See*—
Colbers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, 4,077,973, Cl. 260-314.500.

Eisenbau Wyhlen AG: *See*—
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Heimut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.

Ek, Lars: *See*—
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Elam, James O., to H. B. W. Medical Instruments Manufacturing Company, Inc. Breathing equipment such as resuscitators. 4,077,404, Cl. 128-145.800.

Electricity Council, The: *See*—
Simpson, David Preston, 4,077,465, Cl. 165-84.000.

Elias, Robert T.: *See*—
Butterworth, George A. M.; and Elias, Robert T., 4,077,410, Cl. 128-287.000.

Ellis, Roger M.; and Allgaier, Werner M., to Raychem Corporation. Integrally formed connector. 4,077,692, Cl. 339-103.00M.

Ellis, William Garrettson; Heavner, Paul William, Jr.; and Daugherty, Charles W., to Baxter Travenol Laboratories, Inc. Diagnostic electrode assembly. 4,077,397, Cl. 128-2.06E.

Ellis, William Garrettson, to Baxter Travenol Laboratories, Inc. Diagnostic electrode assembly. 4,077,398, Cl. 128-2.06E.

Elrod, David W.: *See*—
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,077,844, Cl. 195-80.00R.

Emerson Electric Co.: *See*—
Karls, Robert F., 4,077,545, Cl. 222-144.500.

Emery Industries, Inc.: *See*—
Blewett, Charles W.; and Garrett, William R., Jr., 4,078,012, Cl. 260-683.00D.
Blewett, Charles W.; and Garrett, William R., Jr., 4,078,013, Cl. 260-683.00D.

Emery, Roger B. Fastening devices. 4,077,093, Cl. 24-130.000.

Emhart Industries, Inc.: *See*—
Schumacher, Neal P.; and Ghosh, Shyamol K., 4,077,228, Cl. 62-256.000.

Empire Metal Products Corporation: *See*—
Stewart, David E., 4,077,160, Cl. 49-421.000.

Enders, Edgar; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. Certain 1-alkyl-2-dichlorophenyliminopyrrolidines. 4,077,981, Cl. 260-326.850.

Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich. Continuous process of producing polylaurolactam. 4,077,946, Cl. 260-78.00L.

Engel, Fred C.: *See*—
Bishop, Alfred A.; Weiss, Ernst H. G.; and Engel, Fred C., 4,077,835, Cl. 176-18.000.

England, Will Clarke. Agricultural greenhousing reconciling intensified urban methods. 4,077,158, Cl. 47-59.000.

Enquist, Andrew N., to Johnson, Walter I. Device for jigging a fish bait on a line. 4,077,149, Cl. 43-19.200.

Erdmenger, Rudolf: *See*—
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, 4,077,972, Cl. 260-314.500.

Eremenko, Adolf Grigorievich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Erickson, Kent E., to Keuffel & Esser Company. Digital level indicator. 4,077,132, Cl. 33-366.000.

Erkens, Leonardus Johannes Hubertus: *See*—
Colbers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, 4,077,973, Cl. 260-314.500.

Ernest, Robert P.: *See*—
Hideg, Laszlo; and Ernest, Robert P., 4,077,366, Cl. 123-203.000.

Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, to SKF Industrial Trading & Development Co. B.V. Self-centering clutch thrust bearing. 4,077,504, Cl. 192-98.000.

ESB Incorporated: *See*—
Megahed, El Sayed; and Buelow, Carol, 4,078,127, Cl. 429-206.000.

Eskeli, Michael. Rotary heat exchanger with cooling. 4,077,230, Cl. 62-401.000.

Estep, Gordon J.; and Burton, Bernard Lee, to Bendix Corporation, The. Method of manufacture of solderable thin film microcircuit with stabilized resistive films. 4,077,854, Cl. 204-37.00R.

Eswaran, Kapali P.: *See*—
Chen, Tien Chi; Eswaran, Kapali P.; Lum, Vincent Yu-Sun; and Tung, Chin, 4,078,260, Cl. 364-900.000.

Eta A.G. Ebauches-Fabrik: *See*—
Perrot, Friedrich, 4,077,201, Cl. 58-140.00R.

Etablissement Financier et Industriel Intersub: *See*—
Leemann, Karl, 4,077,257, Cl. 73-300.000.

Etat Francais: *See*—
Melchior, Jean; and Andre, Thierry, 4,077,219, Cl. 60-599.000.

Etudes et Fabrications Aeronautiques: *See*—
Maidon, Rene Louis, 4,077,064, Cl. 2-2.10R.

Eucatex S.A. Industria E Comercio: *See*—
Roberts, James R., 4,077,833, Cl. 162-176.000.

Evans, Harold E.: *See*—
Studer, Philip A.; and Evans, Harold E., 4,077,678, Cl. 308-10.000.

Evans, James Gifford, to Bell Telephone Laboratories, Incorporated. Sequence generator having amplitudes and phases of spectral components randomly distributed. 4,078,255, Cl. 364-717.000.

Evans Products Company: *See*—
Krokos, Raymond M., 4,077,332, Cl. 105-477.000.

Everest, Charles Eugene, to Telatemp Corporation. Movable instrument with light emitting position indicator. 4,078,179, Cl. 250-338.000.

Extrados Company Limited: *See*—
Svirklys, Ferdinand M., 4,077,334, Cl. 108-56.100.

Exxon Nuclear Company, Inc.: *See*—
Patterson, John F.; and Flora, Barney S., 4,077,843, Cl. 176-76.000.

Exxon Research & Engineering Co.: *See*—
Aldridge, Clyde L.; and Bearden, Roby, Jr., 4,077,867, Cl. 208-10.000.
Burton, Gilbert W.; and O'Farrell, Charles P., 4,077,933, Cl. 260-29.7EM.
Langer, Arthur W., Jr., 4,078,019, Cl. 260-880.00R.
Moritz, Karsten H.; and Weissman, Walter, 4,077,869, Cl. 208-127.000.
Nahas, Nicholas C.; and Vadovic, Charles J., 4,077,778, Cl. 48-202.000.
Prentice, James S., 4,078,124, Cl. 429-144.000.
Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, 4,078,010, Cl. 260-676.00R.
Wristers, Harry J., 4,077,903, Cl. 252-429.00C.

F. G. Waide, Inc.: *See*—
Figlia, Anthony G., 4,077,360, Cl. 119-51.120.

Fagervold, Leroy W.; Solomon, Irwin J.; Webber, Edward; and Troudt, Jacob, to County of Parkland No. 31. Snow wing gate. 4,077,139, Cl. 37-41.000.

Fahey, William David; and Perez, Paul J., to Singer Company, The. Threshold detector for optical character recognition system. 4,078,227, Cl. 340-146.3AG.

Fahim, Mostafa S. Suppression of spermatogenesis. 4,077,401, Cl. 128-24.00A.

Fairchild Camera and Instrument Corporation: *See*—
Schneider, Mark R., 4,077,200, Cl. 58-50.00R.

Fairmont Steel Products, Inc.: *See*—
Leach, Clayton R., Jr., 4,077,650, Cl. 280-423.00R.

Fairmount Chemical Company, Inc.: *See*—
Kish, Calman J., 4,077,796, Cl. 71-78.000.

Fallenius, Kai, to Outokumpu Oy. Device for dispersing gas into a liquid. 4,078,026, Cl. 261-87.000.

Faltermeier, Georg: *See*—
Bockelmann, Wilfried; and Faltermeier, Georg, 4,078,024, Cl. 261-39.00B.

Fancher, Llewellyn W., to Stauffer Chemical Company. Thiocyanoxanthate miticides. 4,078,079, Cl. 424-301.000.

Farag, Samir F., to Square D Company. Stab assembly for vertical bus bars plug-on unit. 4,077,687, Cl. 339-64.00M.

Fardeau, Michel; Duthion, Louis; and Volat, Jean-Pierre, to Hotchkiss Brandt Sogeme. Method for rapid marking of articles. 4,077,322, Cl. 101-129.000.

Farnsworth, Norman R.; Cordell, Geoffrey A.; and Ogura, Masaru, to University of Illinois Foundation. Phytoquinoid possessing antitumor activity. 4,078,145, Cl. 560-126.000.

Farrissey, William J., Jr.; and Rausch, Karl W., Jr., to Upjohn Company, The. Novel compositions. 4,077,922, Cl. 260-2.50N.

Faul, Josef: *See*—
Gessler, Hans; and Faul, Josef, 4,077,526, Cl. 214-17.00D.

Feaser, David D. Striking device for training in martial arts. 4,077,624, Cl. 272-76.000.

Fedders Corporation: *See*—
Cunningham, Dean; Goeckner, Ralph; Alwardt, Marlin; and Wohltman, Leon, 4,077,116, Cl. 29-727.000.

Federal Cartridge Corporation: *See*—
Sieckert, Edgar W.; Frayseth, Robert D.; and Breckenridge, John R., 4,077,434, Cl. 138-92.000.

Federal-Mogul Corporation: *See*—
Glover, Douglas; and Minter, Marvin J., 4,077,872, Cl. 209-214.000.

Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, to Ruhrchemie Aktiengesellschaft. Method for the preparation of 1,3-diamino-2,2-dimethyl propane. 4,078,003, Cl. 260-583.00P.

Feldberg, Leonard H., to Burndy Corporation. Circuit package receptacle with integral separation means. 4,077,689, Cl. 339-75.00M.

Felix, Arthur Martin; and Spector, Sidney, to Hoffmann-La Roche Inc. Acetylcholine assay. 4,078,049, Cl. 424-1.000.

Fell, Donald Maurice: *See*—
United States of America, National Aeronautics and Space Administration; Anderson, George Edward; Fell, Donald Maurice; and Tesinsky, Jerry Stanley, 4,078,110, Cl. 428-93.000.

Fenzan, Robert K.: *See—*
Reams, Lowell A.; Dunlap, Thomas F.; and Fenzan, Robert K., 4,077,215, Cl. 60-517.000.
Ferranti Limited: *See—*
Ritchie, Grant Edgar; and Morrison, John Malcolm, 4,078,200, Cl. 323-9.000.
Ferrara-Benedek Design, Inc.: *See—*
Ferrara, Daniel A., Jr., 4,077,513, Cl. 206-106.000.
Ferrara, Daniel A., Jr., to Ferrara-Benedek Design, Inc. Latching arrangement for connectable panels. 4,077,513, Cl. 206-106.000.
Ferstandig, Louis L., to Halocarbon Products Corporation. Fluorine substitution in 1,1,1-trihalomethanes. 4,078,007, Cl. 260-653.700.
Fessler, Dyral C.; and Micalizzi, Edwin R., to Morton-Norwich Products, Inc. Phthaloyl amino acid hydroxamic acids. 4,077,998, Cl. 260-518.00R.
Fiat-Allis Construction Machinery, Inc.: *See—*
Hawk, Dale Wyatt, 4,077,649, Cl. 280-420.000.
Fidler, Delmer A.: *See—*
Gavin, David F.; Fidler, Delmer A.; and Tobin, John H., 4,078,000, Cl. 260-577.000.
Fieder, Donald W.: *See—*
Muzyczko, Thaddeus M.; and Fieder, Donald W., 4,077,806, Cl. 96-115.00R.
Fiedler, Marc F.: *See—*
Stanley, Joseph; and Hoerner, Griffith L., 4,077,390, Cl. 126-263.000.
Figlia, Anthony G., to F. G. Waide, Inc. Pet feeding apparatus. 4,077,360, Cl. 119-51.120.
Finike Italiana Marposs, Soc. In Accomandita Semplice di Mario Possati & C.: *See—*
Possati, Mario, 4,077,130, Cl. 33-174.00L.
Fink, Roland: *See—*
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.
Firey, Joseph Carl. Gasoline engine fuel interrupter. 4,077,381, Cl. 123-179.00G.
Fischer, Adolf, deceased (by Fischer, Caecilia Emma, heiress-at-law); Hansen, Hanspeter; and Rohr, Wolfgang, to BASF Aktiengesellschaft. 1-Polyfluoroalkoxyphenyl-4-substituted-5-halopyridazones-6 and herbicidal uses thereof. 4,077,797, Cl. 71-92.000.
Fischer, Caecilia Emma, heiress-at-law: *See—*
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,077,797, Cl. 71-92.000.
Fischer, Joseph: *See—*
Hoyt, John M.; Koch, Karl; and Fischer, Joseph, 4,078,128, Cl. 526-10.000.
Fishbein, William; and Rittenbach, Otto E., to United States of America, Army. Continuous wave correlation radar system. 4,078,234, Cl. 343-9.000.
Fisher, Ralph W.: *See—*
Cheatham, Guy R.; and Fisher, Ralph W., 4,077,627, Cl. 273-73.00R.
Fitz, Herbert: *See—*
Kuhls, Jurgen; Steininger, Alfred; and Fitz, Herbert, 4,078,134, Cl. 526-204.000.
Sulzbach, Reinhard; Kuhls, Jurgen; and Fitz, Herbert, 4,078,135, Cl. 526-209.000.
Fitzgerald, James A.: *See—*
Cromie, Harry W.; Fitzgerald, James A.; Kopp, Clinton V.; and Washington, Freddie L., 4,077,578, Cl. 242-18.00G.
Fitzgerald, Robert Edward, to Chandler Evans Inc. Reduced size altitude insensitive thrust vector control nozzle. 4,077,572, Cl. 239-265.170.
Fives-Cail Babcock: *See—*
Georget, Jean Pierre, 4,077,316, Cl. 100-163.00R.
Flaceliere, Bernard: *See—*
Talvard, Jean-Pierre; Flaceliere, Bernard; and Bunel, Jacques, 4,077,336, Cl. 101-93.050.
Fleissner, Hans, to Vepa AG. Heated roll, such as a godet, in drawing units, for example. 4,077,466, Cl. 165-89.000.
Fletcher, Wade D.; and Norwood, Robert A., to Sonoco Products Company. System for beading and flanging can bodies. 4,077,344, Cl. 113-115.000.
Flinn & Dreffein Engineering Company: *See—*
Kelly, Richard A., 4,078,168, Cl. 219-497.000.
Flora, Barney S.: *See—*
Patterson, John F.; and Flora, Barney S., 4,077,843, Cl. 176-76.000.
FMC Corporation: *See—*
Bunnelle, Philip R., 4,077,481, Cl. 175-232.000.
Bunnelle, Philip R., 4,077,671, Cl. 299-17.000.
Wech, Robert J., 4,077,306, Cl. 93-8.00R.
Young, Sanford Tyler; and Hill, Kenneth Lee, 4,077,982, Cl. 260-340.700.
Foerst, Reiner. Driving simulator. 4,077,138, Cl. 35-11.00R.
Fogel, Isaac. Waterbed frame construction. 4,077,074, Cl. 5-370.000.
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, to Societa' Farmaceutici Italia S.p.A. Methyl-α[3'acetoxy-1'isopropenyl]-3 substituted 1α,5x-4-thia 2,6 diaza[3,2,0]2-heptene-6 acetate 7-one. 4,077,970, Cl. 260-306.70C.
Foglio, Maurizio: *See—*
Bernardi, Luigi; Foglio, Maurizio; and Francheschi, Giovanni, 4,077,969, Cl. 260-306.70C.
Folen, Vincent J.; Vittoria, Carmine; Webb, Denis C.; and Davis, Kenneth L., to United States of America, Navy. Magnetically tuned, surface acoustic wave device. 4,078,186, Cl. 310-313.000.
Folk, Craig L.: *See—*
Kotter, James I.; Hassenboehler, Charles B.; and Folk, Craig L., 4,077,196, Cl. 57-58.950.
Food Automation-Service Techniques, Inc.: *See—*
Koether, Bernard G., 4,077,690, Cl. 339-89.00R.
Forbes, George Alfred. Supporting of ducting. 4,077,592, Cl. 248-59.000.
Ford Motor Company: *See—*
Hideg, Laszlo; and Ernest, Robert P., 4,077,366, Cl. 123-203.000.
Reams, Lowell A.; Dunlap, Thomas F.; and Fenzan, Robert K., 4,077,215, Cl. 60-517.000.
Forney, Joseph M.: *See—*
Curtiss, Walter W., Jr.; and Forney, Joseph M., 4,077,455, Cl. 354 R-.
Forsyth Dental Infirmary for Children: *See—*
DePaola, Paul F., 4,078,053, Cl. 424-52.000.
Forte, John A., Jr.: *See—*
Lelke, Helmut; Howard, Richard A.; Forte, John A., Jr.; and Levinthal, Jay G., 4,078,249, Cl. 364-200.000.
Foster, Kenneth William Samuel, to Renold Limited. Hydrostatic transmission control. 4,077,212, Cl. 60-431.000.
Foster, Sidney. Egg temperature indicating device. 4,077,259, Cl. 73-343.00R.
Fothergill, Derek: *See—*
Cochrane, W. Winston; Geary, Carl H.; and Fothergill, Derek, 4,077,743, Cl. 417-53.000.
Fournex, Robert: *See—*
Clemence, Francois; Humbert, Daniel; and Fournex, Robert, 4,078,076, Cl. 424-283.000.
Nedelec, Lucien; Torelli, Vesperto; and Fournex, Robert, 4,078,059, Cl. 424-242.000.
Fox, Charles L., Jr., to Research Corporation. Cerium sulfadiazine for treating burns. 4,078,058, Cl. 424-228.000.
Fox, Louis. Self-centering posture seat. 4,077,669, Cl. 297-452.000.
Franceschi, Giovanni: *See—*
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.
Francheschi, Giovanni: *See—*
Bernardi, Luigi; Foglio, Maurizio; and Francheschi, Giovanni, 4,077,969, Cl. 260-306.70C.
Francis, Peter M., to Industrial Mining Machinery Company. Impact pulverizing mill with an attrition chamber and a vertical airflow classification chamber. 4,077,574, Cl. 241-52.000.
Francy, James R.: *See—*
Blakeslee, Thomas R.; and Francy, James R., 4,077,486, Cl. 180-79.100.
Frangatos, Gerassimos, to Mobil Oil Corporation. Lubricant composition. 4,077,892, Cl. 252-49.900.
Frank, Werner; Jeschke, Henning; and Burkhardt, Gisbert, to Licentia Patent-Verwaltungs-GmbH. Apparatus for the successive release of items of mail from a stack. 4,077,620, Cl. 271-10.000.
Franz, Joachim, to Sandoz Ltd. Organic compounds. 4,078,065, Cl. 424-261.000.
Frayseth, Robert D.: *See—*
Sieckert, Edgar W.; Frayseth, Robert D.; and Breckenridge, John R., 4,077,434, Cl. 138-92.000.
Fredrickson, Bert E. Compound bow stringing device and compound bow including the same. 4,077,385, Cl. 124-24.00R.
Freeman Chemical Corporation: *See—*
Leitheiser, Robert H.; and Szwarc, John J., 4,078,015, Cl. 260-859.00R.
Freeman, Jerre M. Neutral buoyancy intraocular lens device. 4,077,071, Cl. 3-13.000.
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, to AGFA-Gevaert, A.G. Microfilm reader. 4,077,708, Cl. 353-27.00R.
French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, to Dunlop Holdings Limited. Tire and wheel assemblies. 4,077,453, Cl. 152-330.00L.
Frensch, Heinz: *See—*
Albrecht, Konrad; Frensch, Heinz; Hartel, Kurt; and Stingl, Helmut, 4,078,070, Cl. 424-273.00R.
Frey, Paul Howard; and Kupcikevicius, Vytautas, to Union Carbide Corporation. Food casing stuffing sizing control apparatus. 4,077,090, Cl. 17-41.000.
Fricke, Hans Jurgen, to Robert Bosch GmbH. Steplessly variable hydraulic drive system for vehicle. 4,077,211, Cl. 60-428.000.
Fricker, Ludwig: *See—*
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.
Frischmuth, Robert W.: *See—*
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., 4,077,847, Cl. 201-21.000.
Friske, Alan D.: *See—*
Borostyan, Stephen; Connolly, Douglas P.; and Friske, Alan D., 4,077,709, Cl. 355-3.0TR.
Fritz, Andre: *See—*
Rose, Rod A.; and Fritz, Andre, 4,078,020, Cl. 260-897.00A.
Fritzsche Dodge & Olcott Inc.: *See—*
Kulka, Kurt; Zazula, Teodosij; and Yurecko, John M., 4,077,916, Cl. 252-522.000.

Frye, George Joseph. Analog to digital converter circuit with gain ranging feedback. 4,078,233, Cl. 340-347.0AD.

Fryer, Donald M.; and Reber, Richard K., to Autoclave Engineers, Inc. Apparatus for dispensing and transporting fine materials. 4,077,527, Cl. 214-17.00B.

Fuji Xerox Co., Ltd.: *See—*
Suzuki, Matsumi; and Ichikawa, Yoichi, 4,078,154, Cl. 179-1.0SB.

Fujii, Etsuo: *See—*
Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, 4,077,266, Cl. 73-517.00A.

Fujikura, Yoshiaka: *See—*
Inamoto, Yoshiaka; Fujikura, Yoshiaka; Ikeda, Hiroshi; and Takaishi, Naotake, 4,078,085, Cl. 424-325.000.

Fujimoto, Noriki: *See—*
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.

Fujimura, Akira: *See—*
Nakano, Soichi; Ishii, Yohji; Sekiya, Tetsuo; and Fujimura, Akira, 4,077,373, Cl. 123-117.00A.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kamiya, Takashi; Tanaka, Kunihiko; Teraji, Tsutomu; and Hemmi, Keiji, 4,077,965, Cl. 260-302.0SD.

Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, to Sumitomo Chemical Company, Limited; and Kyodo Chemical Company, Ltd. Tetrahydrophthalimide methyl-2-phenylbenzatriazoles. 4,077,971, Cl. 260-308.00B.

Fukuda, Tosao; and Takahashi, Hiroshi, to Japan Servo Co., Ltd. Centrifugal liquid chromatograph. 4,077,886, Cl. 210-198.00C.

Fukusen, Hiroshi; Yamanaka, Hironori; Oishi, Sachio; and Nakao, Michito, to Sumitomo Chemical Company, Limited. Method for catalyst charging to tubular reactor. 4,077,530, Cl. 214-152.000.

Fuller, Henry C. Automatic safety brake for chain saw. 4,077,125, Cl. 30-382.000.

Fultz, Jack V., to Pertec Computer Corporation. Light amplitude control system for position and motion transducers. 4,078,173, Cl. 250-237.00G.

Fultz, Jack V., to Pertec Computer Corporation. Synthesizer for multiphase waveforms. 4,078,192, Cl. 318-227.000.

Fulwiler, Stanley S., to Tapecon, Inc. Laminate and method for protecting photographic element. 4,077,830, Cl. 156-249.000.

Funk, Albert G.; and Hansen, Gary L., to United States of America, Navy. Impulse compensated continuous rod warhead. 4,077,326, Cl. 102-67.000.

Furukawa Electric Co., Ltd., The: *See—*
Shimano, Takashi; Orimo, Katsumi; and Yamamoto, Shoji, 4,077,603, Cl. 251-205.000.

Fusco, Anthony M., to Milliken Research Corporation. High temperature lubricant. 4,077,992, Cl. 260-410.000.

Gabbard, Henry: *See—*
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.

Gainer, Larry G.; and Wylie, Thomas G., to United States Steel Corporation. Method and apparatus for applying patching or sealing compositions to coke oven side walls and roof. 4,077,848, Cl. 201-41.000.

Galambos, Gyula: *See—*
Kadar, Ferenc; and Galambos, Gyula, 4,077,115, Cl. 29-630.00B.

Gallatin, Paul M., to Allis-Chalmers Corporation. Contactor having means to inhibit contact welding caused by jamming of the armature. 4,078,220, Cl. 335-270.000.

Gandini, Mario, to Durst Ag. Fabrik Fototechnischer. Illuminating equipment for a photographic enlarging or copying apparatus. 4,077,716, Cl. 355-67.000.

Gangemi, Ronald. Isolating and blood pressure transmitting apparatus for extracorporeal blood treatment system. 4,077,882, Cl. 210-90.000.

Gano, John C., to Otis Engineering Corporation. Well flow control system and method. 4,077,472, Cl. 166-315.000.

Ganz Brothers, Inc.: *See—*
Duerr, Joseph W., 4,077,516, Cl. 206-602.000.

Garcia Corporation, The: *See—*
Barnes, Richard D., 4,077,150, Cl. 43-23.000.

Garcia, D. Santos. Process for obtaining materials having low content of soluble elements for multiple applications. 4,077,769, Cl. 8-137.000.

Gardiner, Frances R.: *See—*
Murray, Jerome L.; and Gardiner, Frances R., 4,077,408, Cl. 128-285.000.
Murray, Jerome L.; and Gardiner, Frances R., 4,077,409, Cl. 128-285.000.

Gardner, Jeffrey M., to Container Corporation of America. Partition arrangement. 4,077,561, Cl. 229-42.000.

Gardner, Willis W., to Waukesha Bearings Corporation. Large thrust bearing with lubrication in the spaces between pads. 4,077,682, Cl. 308-160.000.

Garner, Richard L. Novel solar collector. 4,077,392, Cl. 126-271.000.

Garrett, William R., Jr.: *See—*
Blewett, Charles W.; and Garrett, William R., Jr., 4,078,012, Cl. 260-683.00D.
Blewett, Charles W.; and Garrett, William R., Jr., 4,078,013, Cl. 260-683.00D.

Gault, Terrell Wilson, to Procter & Gamble Company, The. Process for preparing detergent compositions. 4,077,897, Cl. 252-99.000.

Gauthier, John A., to GTE Automatic Electric (Canada) Limited. Di-phase pulse receiving system. 4,078,204, Cl. 328-21.000.

Gavin, David F.; Fidler, Delmer A.; and Tobin, John H., to Olin Corporation. Method of isolating and recovering 2,4-dinitro-N-substituted-1,3-phenylenediamine compounds. 4,078,000, Cl. 260-577.000.

Gavin, John Henry, to Du Pont de Nemours, E. I., and Company. Hand tool for inserting electrical contacts. 4,077,117, Cl. 29-739.000.

Geary, Carl H.: *See—*
Cochrane, W. Winston; Geary, Carl H.; and Fothergill, Derek, 4,077,743, Cl. 417-53.000.

Gebler, Kenneth A., to Nalco Chemical Company. Ingot mold base member. 4,077,600, Cl. 249-204.000.

Gebruder Ahle, Firma: *See—*
Borlinghaus, Arthur, 4,077,619, Cl. 267-166.000.

Geissler, Ulrich C.; Stith, William J.; and Jewett, Kathleen J., to Baxter Travenol Laboratories, Inc. Method for the determination of hemoglobin in trace amounts. 4,077,772, Cl. 23-230.00B.

Gelbard, Robert B.; and Griffin, James R., to General Electric Company. Household refrigerator with air circulation and cooling arrangement. 4,077,229, Cl. 62-283.000.

Gelenkwellenbau GmbH: *See—*
Kleinschmidt, Hans-Joachim; and Napierala, Gunter, 4,077,235, Cl. 64-17.00A.

General Cable Corporation: *See—*
Thomas, Robert M.; and Reiser, John R., 4,077,586, Cl. 242-129.500.

General Dynamics: *See—*
Vanderveer, Ramon D.; and Dugan, William P., 4,077,864, Cl. 204-285.000.

General Electric Company: *See—*
Dick, David Cochrane; and Bauer, Fred, 4,077,735, Cl. 407-89.000.
Gelbard, Robert B.; and Griffin, James R., 4,077,229, Cl. 62-283.000.
Lee, Gim Fun, Jr., 4,077,934, Cl. 260-30.60R.
Walker, Wendell C.; Davidson, William E.; and Toft, Kaj, 4,077,143, Cl. 38-77.830.

General Fabric Fusing, Inc.: *See—*
Starbuck, Herman S.; Jones, William Raymond; and Mahn, John Edward, 4,078,113, Cl. 428-196.000.

General Motors Corporation: *See—*
Heilenbach, James W., 4,077,739, Cl. 415-121.00G.
Masta, Robert I., 4,077,372, Cl. 123-117.00D.
Reuter, David F., 4,077,107, Cl. 29-400.00R.

Genev, Ivan Vassilev: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Gentile, Carl A. Rotary valve for internal combustion engines. 4,077,382, Cl. 123-190.00A.

George, Peter K., to Rockwell International Corporation. Multi-segment detector. 4,078,230, Cl. 365-8.000.

Georget, Jean Pierre, to Fives-Cail Babcock. Sugar cane mill. 4,077,316, Cl. 100-163.00R.

Gerber Products Company: *See—*
Lind, Robert B., 4,077,826, Cl. 156-350.000.

Geringer, Donald: *See—*
Zeewy, Abraham; and Geringer, Donald, 4,078,197, Cl. 318-626.000.

Gerstenmeier, Jurgen: *See—*
Leiber, Heinz; Gerstenmeier, Jurgen; and Korasiak, Wolfgang, 4,077,675, Cl. 303-95.000.

Gessler, Hans; and Faul, Josef, to Schwabische Huttenwerke Gesellschaft mit beschrankter Haftung. Silo, especially for heavy flowing chemical and mineral substances. 4,077,526, Cl. 214-17.00D.

Ghosh, Shyamol K.: *See—*
Schumacher, Neal P.; and Ghosh, Shyamol K., 4,077,228, Cl. 62-256.000.

Gibson, Charles E.: *See—*
Asher, Leslie K.; Gibson, Charles E.; and Roetter, Frank T., 4,077,181, Cl. 53-78.000.

Gilbert, L. Eldean: *See—*
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.

Gilleland, Randall C.: *See—*
Bell, Oliver A., Jr.; and Gilleland, Randall C., 4,078,163, Cl. 219-69.00C.

Gilson, Robert E.: *See—*
Gilson, Warren E.; and Gilson, Robert E., 4,077,444, Cl. 141-130.000.

Gilson, Warren E.; and Gilson, Robert E. Fraction collector. 4,077,444, Cl. 141-130.000.

Ginn, LeRoy Dry; Ginn, LeRoyce Sloe; and Travaglio, Dalny, to Universal Pneumatic Controls, Inc. Pneumatic temperature reset differential pressure controller. 4,077,567, Cl. 236-49.000.

Ginn, LeRoyce Sloe: *See—*
Ginn, LeRoy Dry; Ginn, LeRoyce Sloe; and Travaglio, Dalny, 4,077,567, Cl. 236-49.000.

Giolitti, Nicolo; and Bovio, Michele, to Ing. C. Olivetti & C., S.p.A. Printing device for calculating, accounting and similar printing machines. 4,077,505, Cl. 197-1.00R.

Gipson, Robert Malone, to Texaco Development Corporation. Boride catalyst for epoxidizing olefinic compounds. 4,077,986, Cl. 260-348.290.

Girona, Manuel Garcia. Amphibious recreational vehicle. 4,077,351, Cl. 115-27.000.

Girsh, Leonard S. Hypoallergenic chocolate. 4,078,093, Cl. 426-593.000.
Glaesel, Gottfried, to Hego Electric GmbH. Electrical terminal. 4,077,696, Cl. 339-266.00R.
Glasbrenner, Max: *See—*
Schmid, Christian; Glasbrenner, Max; and Heusser, Jean, 4,078,137, Cl. 536-8.000.
Globol-Werk GmbH, Firma: *See—*
von Philipp, Fritz, 4,077,183, Cl. 53-111.00R.
Glockner, Peter W.; and Richardson, J. David, to Shell Oil Company. Selective hydrogenation of dienes using nickel/aluminum sulfide catalyst. 4,078,011, Cl. 260-677.00H.
Glover, Douglas; and Minter, Marvin J., to Federal-Mogul Corporation. Magnetic separator and method for separating magnetic particles from non-magnetic particles. 4,077,872, Cl. 209-214.000.
Godwin, Robert H.: *See—*
Pinaire, Lon W.; and Godwin, Robert H., 4,077,596, Cl. 248-379.000.
Goeckner, Ralph: *See—*
Cunningham, Dean; Goeckner, Ralph; Alwardt, Marlin; and Wohltman, Leon, 4,077,116, Cl. 29-727.000.
Goldman, Leonard H., to Schlumberger Technology Corporation. Neutron borehole logging correction technique. 4,078,174, Cl. 250-270.000.
Goldstein, Gideon, to Sloan-Kettering Institute for Cancer Research. Polypeptide hormones of the thymus. 4,077,949, Cl. 260-112.50R.
Goloff, Alexander, to Caterpillar Tractor Co. End housing clamps for rotary mechanisms. 4,077,751, Cl. 418-270.000.
Gomyo, Noboru: *See—*
Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, 4,077,923, Cl. 260-2.300.
Goode, David P. Window mount ski rack. 4,077,554, Cl. 224-42.46R.
Goodridge, Paul A., to Owens-Corning Fiberglas Corporation. Noise suppressor for a row of rotary fiberizers. 4,077,790, Cl. 65-11.00R.
Goodwin, Wendell W. Propeller shaft anodic protector kit. 4,077,742, Cl. 416-245.00A.
Goodyear Tire & Rubber Company, The: *See—*
Curtiss, Walter W., Jr.; and Forney, Joseph M., 4,077,455, Cl. 354 R-.
Kline, Richard H., 4,077,942, Cl. 260-45.85S.
Gorlitz, Manfred: *See—*
Vollkommer, Norbert; Richtzenhain, Hermann; Bier, Gerhard; and Gorlitz, Manfred, 4,078,148, Cl. 560-185.000.
Goscenski, Edward J., Jr., to Eaton Corporation. Differential gear mechanism. 4,077,279, Cl. 74-711.000.
Goswami, Jagadish C., to Stauffer Chemical Company. Polyvinyl halide-bis(hydrocarbyl) vinylphosphonate copolymers crosslinked with amines. 4,078,130, Cl. 526-17.000.
Gould, Inc.: *See—*
Kozacka, Frederick J., 4,078,221, Cl. 337-168.000.
Graham, Laurence Drell: *See—*
Neti, Radhakrishna Murty; and Graham, Laurence Drell, 4,077,774, Cl. 23-232.00R.
Graham, Robert T., Jr.; Stevens, Robert M.; and Kinnard, Kenneth F., to Raytheon Company. Receiver for optical radar. 4,077,718, Cl. 356-4.000.
Grasser, Katalin: *See—*
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.
Gratzmuller, Claude Alain. Safety-valve stopper especially intended for electric storage batteries. 4,078,121, Cl. 429-54.000.
Gravel, Robert L., to Sperry Rand Corporation. Low charge-voltage frost recording on a photosensitive thermoplastic medium. 4,077,803, Cl. 96-1.100.
Gray, George William; and McDonnell, Damien Gerard, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Optically active cyano-biphenyl compounds and liquid crystal materials containing them. 4,077,260, Cl. 73-356.000.
Great Lakes Chemical Corporation: *See—*
Levek, Robert P.; and Heath, Perry C., 4,078,089, Cl. 424-349.000.
Grecu, Renato: *See—*
Ribaldone, Giuseppe; and Grecu, Renato, 4,077,966, Cl. 260-302.00D.
Green, Donald T., to United States Steel Corporation. X-ray inspection of welds. 4,078,180, Cl. 250-358.00R.
Green, LaVerne Merritt. Dip storage, insertion and ejection tool. 4,077,557, Cl. 227-83.000.
Green, Sydney James: *See—*
Baker, Richard Roland; Green, Sydney James; and Kilburn, Keith Douglas, 4,077,414, Cl. 131-8.00R.
Greene, Robert I., to Itek Corporation. Adjustable optical cam. 4,077,715, Cl. 355-57.000.
Greenview Manufacturing Company: *See—*
Siemund, Herbert A.; and Wilson, Earl, 4,077,083, Cl. 15-244.00R.
Greer Hydraulics, Inc.: *See—*
Zahid, Abduz, 4,077,100, Cl. 29-157.00R.
Greig, William Joseph. Mirror. 4,077,597, Cl. 248-477.000.
Gresham, Lucius C., Jr., to Henderson Clay Products, Inc. Method and apparatus for fabricating irregular shaped brick. 4,078,038, Cl. 264-293.000.
Griffin, James R.: *See—*
Gelbard, Robert B.; and Griffin, James R., 4,077,229, Cl. 62-283.000.
Grisell, Ronald D. Apparatus and method for the imaging of the internal structure of a three-dimensional solid and/or liquid object. 4,077,253, Cl. 73-629.000.
Grosseau, Albert, to Societe Anonyme Automobiles Citroen. Means for the securing, in a cylindrical member, of a circular discoid member. 4,077,232, Cl. 64-11.00R.
Grosso, Philip, to Kaiser Aluminum & Chemical Corporation. Caustic cooling system. 4,077,463, Cl. 165-1.000.
Grote & Hartmann: *See—*
Konnemann, Alfred; and Reinertz, Rudolf, 4,077,698, Cl. 339-276.00R.
Ground Hog, Inc.: *See—*
Carlson, Paul R.; and Carlson, Richard L., 4,077,480, Cl. 173-22.000.
Grove Valve and Regulator Company: *See—*
Combes, Marvin G., 4,077,604, Cl. 251-329.000.
Grumman Aerospace Corporation: *See—*
Tuttle, William D., 4,078,165, Cl. 219-121.00L.
Grunwell, Joyce Francis: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,060, Cl. 424-242.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,061, Cl. 424-242.000.
GTE Automatic Electric (Canada) Limited: *See—*
Gauthier, John A., 4,078,204, Cl. 328-21.000.
GTE Automatic Electric Laboratories Incorporated: *See—*
Lender, Adam; and Olszanski, Henry H., 4,078,157, Cl. 179-16.0EA.
Lender, Adam; and Olszanski, Henry H., 4,078,159, Cl. 178-68.000.
Gube, Karlheinz: *See—*
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.
Gueguin, Michel, to Quebec Iron and Titanium Corporation - Fer et Titane du Quebec, Inc. Chlorination of titanium slags. 4,078,039, Cl. 423-74.000.
Guertin Brothers, Inc.: *See—*
Twichell, Paul M., 4,077,284, Cl. 81-7.000.
Guescier, Andre: *See—*
Mathern, Guy; Lefevre, Jean; Tricot, Roland; and Guessier, Andre, 4,077,108, Cl. 29-403.000.
Gulf & Western Industries, Inc.: *See—*
Soulsby, Donald R.; and Seipp, William H., 4,078,259, Cl. 364-900.000.
Gulf & Western Manufacturing Company: *See—*
Spanke, Edwin A., 4,077,523, Cl. 214-1.0BD.
Gundzik, Richard M.: *See—*
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., 4,077,847, Cl. 201-21.000.
Gunther, Dieter; and Papenfuhs, Theodor, to Hoechst Aktiengesellschaft. Yellow to blue dyestuffs of the benzo-benzimidazo(1,2-a)-quinoline series, process for their manufacture, and their use. 4,077,961, Cl. 260-281.00P.
Gurley, Grey M. Sailboat construction. 4,077,345, Cl. 114-39.000.
Gusakov, Sergei Sergeevich: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.
Gutkowski, Donald: *See—*
Malacheski, Joseph J.; and Zenda, Richard J., 4,077,544, Cl. 222-95.000.
H. B. W. Medical Instruments Manufacturing Company, Inc.: *See—*
Elam, James O., 4,077,404, Cl. 128-145.800.
Haas, Herbert G.: *See—*
Munk, Edmund E.; and Haas, Herbert G., 4,078,030, Cl. 264-109.000.
Habermann, Wolfgang; Stockburger, Dieter; Thoma, Peter; and Csizi, Gotthard, to BASF Aktiengesellschaft. Removal of mercury from liquids. 4,077,856, Cl. 204-149.000.
Hackel, Eberhard: *See—*
Heinze, Helmut; and Hackel, Eberhard, 4,077,945, Cl. 260-75.00M.
Haerten, Rainer; and Kresse, Heinz, to Siemens Aktiengesellschaft. Apparatus for infusing liquids into human or animal bodies. 4,077,405, Cl. 128-214.00F.
Haffer, Gregor: *See—*
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,077,996, Cl. 260-464.000.
Hagedorn, Floyd T.: *See—*
Calevro, Torino E.; and Hagedorn, Floyd T., 4,077,792, Cl. 65-288.000.
Hagen, Glenn E., to Williams, Inc. Wave driven generator. 4,077,213, Cl. 60-500.000.
Hagermo, Kjell Gustaf Roland, to Telefonaktiebolaget L M Ericsson. Contact device. 4,077,691, Cl. 339-95.00R.
Haglund, Robert J. Horticultural container assembly having false bottom and saucer. 4,077,159, Cl. 47-66.000.
Hairsine, Peter Wilfred: *See—*
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, 4,078,078, Cl. 424-283.000.
Hajek, Jan: *See—*
Peka, Ivo; Vodicka, Ludek; Ulrich, Jan; and Hajek, Jan, 4,077,800, Cl. 75-108.000.
Hajos, Zoltan George, to Hoffmann-La Roche, Inc. Stereospecific total

steroidal synthesis via substituted C/D-trans indanones. 4,077,983, Cl. 260-340.9AS.

Hake, George H. Adjustable liquid dispensing pump. 4,077,750, Cl. 417-552.000.

Halatek, Richard J. Safety shield assembly for centrifugal casting apparatus. 4,077,460, Cl. 164-152.000.

Halocarbon Products Corporation: *See—*
Ferstandig, Louis L., 4,078,007, Cl. 260-653.700.

Halvorson, Thomas Gilbert; and Eardley, Edward Paul, to Union Carbide Corporation. Shaft furnace for pyrolysis of refuse with bed support structure. 4,077,338, Cl. 110-235.000.

Hamada, Arinobu: *See—*
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Hamamoto, Toshikazu: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,078,006, Cl. 260-621.00G.

Hamilton, Stephen P., to Texas Instruments Incorporated. Electronic calculator or microprocessor with mask logic effective during data exchange operation. 4,078,251, Cl. 364-700.000.

Hammann, Ingeborg: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.

Hammond, James T., to Caterpillar Tractor Co. Engine speed reducer responsive to positioning of the transmission shift lever. 4,077,283, Cl. 74-860.000.

Hamrick, Joseph T.; and Rose, Leslie C., to World Energy Systems. Downhole recovery system. 4,077,469, Cl. 166-59.000.

Hamuro, Mituro; Taki, Tsuneo; and Tsuino, Yasuhiro, to Murata Manufacturing Co., Ltd. Fixing device for electrical and electronic components. 4,077,439, Cl. 140-1.000.

Hanaoka, Masatoshi: *See—*
Sakuma, Tadashi; and Hanaoka, Masatoshi, 4,077,199, Cl. 58-23.0BA.

Hankel, Keith M., to Acon, Inc. Acoustical composite. 4,077,491, Cl. 181-290.000.

Hans Kolb GmbH & Co., Firma: *See—*
Wiesbock, Josef, 4,077,585, Cl. 242-107.40B.

Hansen, Charles D.: *See—*
Kersey, Carl H.; and Hansen, Charles D., 4,077,573, Cl. 241-32.000.

Hansen, Gary L.: *See—*
Funk, Albert G.; and Hansen, Gary L., 4,077,326, Cl. 102-67.000.

Hansen, George A.: *See—*
Schlaefer, Francis W.; and Hansen, George A., 4,078,004, Cl. 260-604.00R.

Hansen, Hanspeter: *See—*
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,077,797, Cl. 71-92.000.

Harada, Toshiaki: *See—*
Shimada, Keizo; Harada, Toshiaki; and Koga, Masahiro, 4,077,960, Cl. 260-281.0NH.

Harder, Arthur J., Jr., to Coach and Car Equipment Corporation. Seat with cushioned grab bar. 4,077,664, Cl. 297-183.000.

Harmon, William A.: *See—*
Van Doorn, Donald W.; and Harmon, William A., 4,077,531, Cl. 214-309.000.

Harmony Emitter Company: *See—*
Harmony, Richard C., 4,077,571, Cl. 239-107.000.

Harmony Emitter Company, Inc.: *See—*
Harmony, Richard C., 4,077,570, Cl. 239-107.000.

Harmony, Richard C., to Harmony Emitter Company, Inc. Penetrably mounted emitter for conduits. 4,077,570, Cl. 239-107.000.

Harmony, Richard C., to Harmony Emitter Company. Fluid flow regulator. 4,077,571, Cl. 239-107.000.

Harms, Wolfgang; and Hullstrung, Dieter, to Bayer Aktiengesellschaft. Water-soluble anthraquinone dyestuff. 4,077,987, Cl. 260-374.000.

Harnischfeger Corporation: *See—*
Morters, Ronald W.; and Millonzi, Lawrence A., 4,078,191, Cl. 318-227.000.
Nash, James N.; Morters, Ronald W.; and Millonzi, Lawrence A., 4,078,189, Cl. 318-227.000.
Nash, James N., 4,078,190, Cl. 318-227.000.

Harper, Alex M. Stabilizer keel. 4,077,077, Cl. 9-310.00A.

Harper, Roland George, Jr.: *See—*
Callegari, Stephen R.; Moncus, James D.; and Harper, Roland George, Jr., 4,077,525, Cl. 214-2.500.

Harrigan, Roy Major. External cardiac resuscitation aid. 4,077,400, Cl. 128-24.00R.

Harris, Alan Winston: *See—*
Klinner, Wilfred Erwin; and Harris, Alan Winston, 4,077,192, Cl. 56-16.400.

Harry, Ieuan L.: *See—*
Saumsiegle, Robert W.; and Harry, Ieuan L., 4,077,759, Cl. 425-451.000.

Hart, Cornelis Maria; and Slob, Arie, to U.S. Philips Corporation. Linear amplifier circuit with integrated current injector. 4,078,208, Cl. 330-296.000.

Hart, Una L. Deodorant compositions and process of deodorizing using 2,4-disubstituted 6-hydroxy-1,3-dioxane compounds. 4,078,050, Cl. 424-76.000.

Hartel, Kurt: *See—*
Albrecht, Konrad; Frensch, Heinz; Hartel, Kurt; and Stingl, Helmut, 4,078,070, Cl. 424-273.00R.

Harter Corporation: *See—*
Saam, Charles W., 4,077,594, Cl. 248-188.700.

Hartshorn, Wayne T., to Research-Cottrell, Inc. Corrosion resistant electrostatic precipitator. 4,077,785, Cl. 55-155.000.

Haschka, Gerhard: *See—*
Brandstatter, Wilhelm; Haschka, Gerhard; and Heindze, Herbert, 4,078,108, Cl. 428-480.000.

Hasegawa, Katsue: *See—*
Asakawa, Shirow; Saito, Yukihiro; and Hasegawa, Katsue, 4,077,805, Cl. 96-115.00P.

Hasenwinkle, Earl D.; Pangilinan, Ernesto M.; and Wislocker, Frank, to Weyerhaeuser Company. Improved edging system. 4,077,448, Cl. 144-118.000.

Hashio, Moriki; and Terashima, Toshio, to Sumitomo Metal Industries Limited; and Sumitomo Shipbuilding and Machinery Co. Ltd. Molten metal pouring control method and apparatus for use in continuous casting equipment. 4,077,457, Cl. 164-4.000.

Hassenboehler, Charles B.: *See—*
Kotter, James I.; Hassenboehler, Charles B.; and Folk, Craig L., 4,077,196, Cl. 57-58.950.

Hata, Yasuhisa, to Nippon Air Brake Co., Ltd., The. Vehicle load responsive brake pressure control device. 4,077,676, Cl. 303-22.00A.

Hattori, Hiroyuki: *See—*
Komori, Shigehiro; Hattori, Hiroyuki; Inuzuka, Tsuneki; and Miyamoto, Koichi, 4,077,714, Cl. 355-51.000.

Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, to Nippon Soken, Inc. Additional air control device for maintaining constant air-fuel ratio. 4,077,207, Cl. 60-276.000.

Hattori, Tadashi. Flame and smoke shutoff system. 4,077,474, Cl. 169-48.000.

Hatz, Ernst, to Motorenfabrik Hatz GmbH & Co. KG. Internal combustion engine with sound deadening jacketing. 4,077,383, Cl. 123-198.00E.

Hauck, Frederic Peter; and Sundeen, Joseph E., to E. R. Squibb & Sons, Inc. Cyclohexane tetrols and derivatives thereof. 4,078,066, Cl. 424-266.000.

Haug, Heinz; and Kas, Gunter, to Robert Bosch GmbH. Ignition distributor breaker assembly. 4,078,161, Cl. 200-19.00R.

Haugen, John H.: *See—*
Jones, Herman L.; and Haugen, John H., 4,077,827, Cl. 156-352.000.

Hauni Werke Korber & Co., KG: *See—*
Rudszinat, Willy, 4,077,289, Cl. 83-152.000.

Hawk, Dale Wyatt, to Fiat-Allis Construction Machinery, Inc. Articulated vehicle hitch. 4,077,649, Cl. 280-420.000.

Hawkings, David Leonard: *See—*
Lowson, Martin Vincent; Hawkings, David Leonard; Byham, Geoffrey Malcolm; and Perry, Frederick John, 4,077,741, Cl. 416-228.000.

Hawkins, James W., to Wellco Carpet Corporation. Tufting method of reducing yarn wastes during the tufting process. 4,077,343, Cl. 112-410.000.

Hawkins, Ronald James, to Babcock & Wilcox, Limited. Steam-water separator arrangement. 4,077,362, Cl. 122-491.000.

Hayashi, Kohji: *See—*
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.

Hayashi, Shizuo: *See—*
Okumura, Takeo; Hayashi, Shizuo; Majima, Kanji; and Takei, Kensuke, 4,077,911, Cl. 252-550.000.

Hayashi, Yoshimasa; and Sensui, Kunio, to Nissan Motor Company, Limited. Core and method for casting cylinder head with exhaust port. 4,077,458, Cl. 164-11.000.

Hayasi, Yosio: *See—*
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.

Haybuster Manufacturing, Inc.: *See—*
Neukom, Chester G., 4,077,478, Cl. 172-267.000.

Heath, Perry C.: *See—*
Levek, Robert P.; and Heath, Perry C., 4,078,089, Cl. 424-349.000.

Heaton, George N., to Claro Laboratories, Inc. Combination shipping and display container. 4,077,512, Cl. 206-45.200.

Heavner, Paul William, Jr.: *See—*
Ellis, William Garrettson; Heavner, Paul William, Jr.; and Daugherty, Charles W., 4,077,397, Cl. 128-2.06E.

Hebert, Frederick G. Race track game. 4,077,628, Cl. 273-86.00C.

Hechtle, Emil, to Radiant Pen Corporation. Grip-lock pen. 4,077,726, Cl. 401-209.000.

Hedges, Robert D. Anaerobic jar. 4,077,846, Cl. 195-139.000.

Hego Electric GmbH: *See—*
Glaesel, Gottfried, 4,077,696, Cl. 339-266.00R.

Heilenbach, James W., to General Motors Corporation. Engine turbocharger turbine inlet screen. 4,077,739, Cl. 415-121.00G.

Heim Universal Inc.: *See—*
McCloskey, Albert R., 4,077,681, Cl. 308-72.000.

Heindze, Herbert: *See—*
Brandstatter, Wilhelm; Haschka, Gerhard; and Heindze, Herbert, 4,078,108, Cl. 428-480.000.

Heinze, Helmut; and Hackel, Eberhard, to Zimmer Aktiengesellschaft. Process for making linear polyesters from ethylene glycol and terephthalic acid. 4,077,945, Cl. 260-75.00M.

Heller, Harold: *See—*
Corte, Herbert; Heller, Harold; and Netz, Otto, 4,077,918, Cl. 260-2.10E.

Helmes, Franciscus Jacobus, to Helmes Machinefabriek B. V. Copy milling machine. 4,077,449, Cl. 144-144.00A.
Helmes Machinefabriek B. V.: *See—*
Helmes, Franciscus Jacobus, 4,077,449, Cl. 144-144.00A.
Hemmi, Keiji: *See—*
Kamiya, Takashi; Tanaka, Kunihiko; Teraji, Tsutomu; and Hemmi, Keiji, 4,077,965, Cl. 260-302.0SD.
Hempell, Leo Bruce, to Quality Technology Ltd. Remote switching apparatus. 4,078,236, Cl. 343-228.000.
Henderson Clay Products, Inc.: *See—*
Gresham, Lucius C., Jr., 4,078,038, Cl. 264-293.000.
Henke, Werner. Neutralization of gases. 4,077,777, Cl. 23-288.00R.
Henkel Kommanditgesellschaft auf Aktien (Henkel KGaA): *See—*
Blum, Helmut; and Worms, Karl-Heinz, 4,077,997, Cl. 260-502.40P.
Henning, Bodo, to Volkswagenwerk Aktiengesellschaft. Cable assembly. 4,077,277, Cl. 74-501.00P.
Herb, Carl C.: *See—*
McCabe, Frank J., Jr.; Coleman, Milton H.; and Herb, Carl C., 4,077,310, Cl. 98-40.00D.
Herchenbach, Horst: *See—*
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.
Hercules Incorporated: *See—*
Colbers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, 4,077,973, Cl. 260-314.500.
Hering, Walton C. Front mounted adjustable twin rakes. 4,077,189, Cl. 56-11.900.
Herr, Leroy E., to Mosser Industries, Inc. Purged valve. 4,077,432, Cl. 137-601.000.
Herrick, Wallace D.; and Yonkers, Robert A., to Bissell, Inc. Dry shaver with floating peripherally supported shear plate. 4,077,120, Cl. 30-43.500.
Herrington, William Edsel. Mechanical corner system for brickmasons. 4,077,127, Cl. 33-85.000.
Hess, Hans-Jurgen E.; and Schaaf, Thomas K., to Pfizer Inc. Dimethyl 2-oxo-6-cyanohexyl-phosphonate. 4,078,021, Cl. 260-940.000.
Heumann, Jules M., to Metropolitan Furniture Manufacturing Co. Modular seating arrangement and method. 4,077,666, Cl. 297-440.000.
Heusser, Jean: *See—*
Schmid, Christian; Glasbrenner, Max; and Heusser, Jean, 4,078,137, Cl. 536-8.000.
Hewlett-Packard Company: *See—*
Bagley, Alan S., 4,078,257, Cl. 364-900.000.
Heyer, Bruce A.; and Huth, Donald L., to Abex Corporation. Iron-chromium-nickel heat resistant castings. 4,077,801, Cl. 75-122.000.
Hickman, Donald A., Sr.; Hrabak, John H.; and Rosenberger, Paul C., to Caterpillar Tractor Co. Annular single piston brake arrangement. 4,077,500, Cl. 188-106.00P.
Hideg, Laszlo; and Ernest, Robert P., to Ford Motor Company. Internal combustion engine control system. 4,077,366, Cl. 123-203.000.
Hilemn, Charles. Furniture kit. 4,077,517, Cl. 206-577.000.
Hill, Daniel. Lock light. 4,078,248, Cl. 362-100.000.
Hill, John W. Garage door operator. 4,077,268, Cl. 74-89.150.
Hill, Kenneth Lee: *See—*
Young, Sanford Tyler; and Hill, Kenneth Lee, 4,077,982, Cl. 260-340.700.
Hill, William E.: *See—*
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.
Hills, William H.: *See—*
Bowden, Woodrow Raleigh; Hills, William H.; and Winner, Frank Edward, 4,077,197, Cl. 57-156.000.
Hilti Aktiengesellschaft: *See—*
Buchel, Franz, 4,077,556, Cl. 227-8.000.
Hindman, Milo F. Patio roof. 4,077,175, Cl. 52-263.000.
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, to Kubota Tekko Kabushiki Kaisha. Tractor type vehicle including engine and load control therefor and provided with rotary working implement. 4,077,475, Cl. 172-3.000.
Hinz, Arnulf: *See—*
Stenzel, Jurgen; and Hinz, Arnulf, 4,077,908, Cl. 252-455.00R.
Hirao, Kazunari: *See—*
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, 4,078,045, Cl. 423-416.000.
Hiris, Otto: *See—*
Smejkal, Hellmuth; Hiris, Otto; and Mayrandl, Helmut, 4,077,616, Cl. 266-281.000.
Hirose, Katsumi: *See—*
Maeda, Ryozo; and Hirose, Katsumi, 4,077,968, Cl. 260-306.80R.
Hirsekorn, Edward R.: *See—*
Donnard, Reed E.; and Hirsekorn, Edward R., 4,077,147, Cl. 42-1.00L.
Hitachi, Ltd.: *See—*
Matsuda, Hisashi, 4,078,176, Cl. 250-296.000.
Murakami, Tadao, 4,077,255, Cl. 73-117.000.
Murakosi, Takeo; and Tanno, Toshiyuki, 4,078,198, Cl. 318-627.000.
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.
Omori, Takashi; and Sugiyama, Sakae, 4,077,836, Cl. 176-22.000.
Umehara, Noboru; and Takeshita, Hidetoshi, 4,077,244, Cl. 72-129.000.
Hitachi Shipbuilding & Engineering Co., Ltd.: *See—*
Inoue, Takehiko; Tabata, Junichi; Ohishi, Hidekatsu; and Murata, Seiichiro, 4,077,346, Cl. 114-74.00A.
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument having transient musical effects. 4,077,294, Cl. 84-1.230.
Hodgkinson, Robert, to Lang Research Corporation. Variable displacement and/or variable compression ratio piston engine. 4,077,269, Cl. 74-60.000.
Hodgson, Alfred W.; and Collins, James D., to Westinghouse Electric Corporation. Magnetic contactor. 4,078,218, Cl. 335-128.000.
Hodgson, Alfred W., to Westinghouse Electric Corporation. Overcurrent latch for magnetic contactor. 4,078,219, Cl. 335-167.000.
Hoechst Aktiengesellschaft: *See—*
Albrecht, Konrad; Frensch, Heinz; Hartel, Kurt; and Stingl, Helmut, 4,078,070, Cl. 424-273.00R.
Babej, Milos; Bartmann, Wilhelm; and Lerch, Ulrich, 4,078,083, Cl. 424-317.000.
Gunther, Dieter; and Papenfuhs, Theodor, 4,077,961, Cl. 260-281.00P.
Kuhls, Jurgen; Steininger, Alfred; and Fitz, Herbert, 4,078,134, Cl. 526-204.000.
Lerch, Ulrich; Babej, Milos; Bartmann, Wilhelm; and Kunstmann, Rudolf, 4,078,081, Cl. 424-305.000.
Lippsmeier, Bernd; Roszinski, Hilmar; and Stephan, Hans-Werner, 4,078,023, Cl. 260-986.000.
Stenzel, Jurgen; and Hinz, Arnulf, 4,077,908, Cl. 252-455.00R.
Sulzbach, Reinhard; Kuhls, Jurgen; and Fitz, Herbert, 4,078,135, Cl. 526-209.000.
Tzschoppe, Eberhard; and Weinlich, Jurgen, 4,077,135, Cl. 34-57.00R.
von der Eltz, Hans-Ulrich; and Pfeiffer, Gerhard, 4,077,764, Cl. 8-18.00A.
von der Eltz, Hans-Ulrich, 4,077,766, Cl. 8-44.000.
Winkelmann, Erhardt; and Raether, Wolfgang, 4,078,086, Cl. 424-326.000.
Hoehn, Hans: *See—*
Denzel, Theodor; and Hoehn, Hans, 4,077,955, Cl. 260-250.0BC.
Denzel, Theodor; and Hoehn, Hans, 4,078,064, Cl. 424-251.000.
Hoerner, Griffith L.: *See—*
Stanley, Joseph; and Hoerner, Griffith L., 4,077,390, Cl. 126-263.000.
Hoffmann-La Roche Inc.: *See—*
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,077,985, Cl. 260-346.600.
Felix, Arthur Martin; and Spector, Sidney, 4,078,049, Cl. 424-1.000.
Hajos, Zoltan George, 4,077,983, Cl. 260-340.9AS.
Jaunin, Roland, 4,077,978, Cl. 260-326.100.
Hofmann, Wilfried: *See—*
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, 4,077,708, Cl. 353-27.00R.
Hogg, Walter R., to Coulter Electronics, Inc. Sample ejection system including temperature control. 4,077,749, Cl. 417-321.000.
Holland, Donald L., to Hunt Manufacturing Co. Vertical entry multiple paper punch. 4,077,288, Cl. 83-146.000.
Hollander, Bruce Lee. Stringed racket face tension measuring device. 4,077,256, Cl. 73-145.000.
Holt, James L.: *See—*
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., 4,077,437, Cl. 139-116.000.
Holt, Thomas: *See—*
Bonora, Anthony C.; and Holt, Thomas, 4,077,485, Cl. 180-68.500.
Holz, Norbert J.: *See—*
Holz, Orville H., Sr.; and Holz, Norbert J., 4,077,731, Cl. 404-83.000.
Holz, Orville H., Jr.: *See—*
Holz, Orville H., Sr.; and Holz, Norbert J., 4,077,731, Cl. 404-83.000.
Holz, Orville H., Sr.; and Holz, Norbert J., to Holz, Orville H., Jr., a part interest. Reinforcing wire laying machines and attachments. 4,077,731, Cl. 404-83.000.
Homeyer, Bernhard: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.
Homma, Yasuo: *See—*
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.
Hommel Aktiengesellschaft: *See—*
Schmid, Christian; Glasbrenner, Max; and Heusser, Jean, 4,078,137, Cl. 536-8.000.
Honacker, Horst, to Dart Industries. Insulator means for electrostatic precipitators. 4,077,783, Cl. 55-146.000.
Honda Giken Kogyo Kabushiki Kaisha: *See—*
Nakano, Soichi; Ishii, Yohji; Sekiya, Tetsuo; and Fujimura, Akira, 4,077,373, Cl. 123-117.00A.
Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, 4,077,266, Cl. 73-517.00A.
Honeywell Inc.: *See—*
Stauffer, Norman L., 4,078,171, Cl. 250-201.000.
Wilwerding, Dennis J., 4,078,172, Cl. 250-201.000.

Honeywell Information Systems Inc.: *See*—
Nibby, Chester M., Jr.; and Barlow, George J., 4,077,565, Cl. 235-312.000.
Hooker Chemicals & Plastics Corporation: *See*—
Robota, Stephen; and Whelan, James A., 4,077,850, Cl. 203-29.000.
Horiuchi, Yukio: *See*—
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.
Hornberger, Paul: *See*—
Blechschmitt, Kurt; Reuter, Peter; Wirth, Friedrich; and Hornberger, Paul, 4,077,984, Cl. 260-346.400.
Hornig, Rudolf; Beeskow, Bruno; and Worner, Gunter, to Daimler-Benz Aktiengesellschaft. Installation for vibration damping in drive connections of motor vehicles. 4,077,233, Cl. 64-11.00R.
Hornle, Reinhold: *See*—
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, 4,077,972, Cl. 260-314.500.
Horowitz, Martin, to Saviers, George B., Jr. Method for electrically cracking petroleum crude. 4,077,870, Cl. 208-128.000.
Hotchkiss Brandt Sogeme: *See*—
Fardeau, Michel; Duthion, Louis; and Volat, Jean-Pierre, 4,077,322, Cl. 101-129.000.
Houee, Yvon; and Santier, Claudine, to Societe Francaise des Telephones Ericsson. Call distributing automatic telephone installation. 4,078,158, Cl. 179-27.00D.
Howard, Richard A.: *See*—
Lelke, Helmut; Howard, Richard A.; Forte, John A., Jr.; and Levinthal, Jay G., 4,078,249, Cl. 364-200.000.
Howard, Wesley E. Device for imparting smoke flavor to liquids. 4,077,312, Cl. 99-471.000.
Hoyt, John M.; Koch, Karl; and Fischer, Joseph, to National Distillers and Chemical Corporation. Process for rendering ethylene-vinyl acetate copolymers agglomeration-resistant. 4,078,128, Cl. 526-10.000.
Hrabak, John H.: *See*—
Hickman, Donald A., Sr.; Hrabak, John H.; and Rosenberger, Paul C., 4,077,500, Cl. 188-106.00P.
Hreha, Emanuel N. Radial arm saw table top. 4,077,290, Cl. 83-471.200.
Huber, Charles L., to Xerox Corporation. Curl detector and separator. 4,077,519, Cl. 209-74.00R.
Hughes, O. Richard, to Celanese Corporation. Polybenzimidazole fiber supported catalyst. 4,077,906, Cl. 252-431.00C.
Hullstrung, Dieter: *See*—
Harms, Wolfgang; and Hullstrung, Dieter, 4,077,987, Cl. 260-374.000.
Humbert, Daniel: *See*—
Clemence, Francois; Humbert, Daniel; and Fournex, Robert, 4,078,076, Cl. 424-283.000.
Humphrey, Kenneth Michael, to Underwater and Marine Equipment Limited. Articulated joint. 4,077,218, Cl. 60-592.000.
Hunner, Manfred: *See*—
Peehs, Martin; and Hunner, Manfred, 4,077,839, Cl. 176-78.000.
Hunt, Clarence H.: *See*—
Rollor, Edward A., Jr.; and Hunt, Clarence H., 4,077,122, Cl. 30-133.000.
Hunt Manufacturing Co.: *See*—
Holland, Donald L., 4,077,288, Cl. 83-146.000.
Hurst, Gerald L. Permanently buoyant balloon. 4,077,588, Cl. 244-31.000.
Hutchens, Morris L., to Kearney & Trecker Corporation. Drill speeder for machine tools. 4,077,736, Cl. 408-16.000.
Hutchins, Alma A. Abrading tool clip with automatic take-up. 4,077,165, Cl. 51-386.000.
Hutchison, Charles Bryce, to Lion Oil Company. Concrete curing composition. 4,078,117, Cl. 428-446.000.
Huth, Donald L.: *See*—
Heyer, Bruce A.; and Huth, Donald L., 4,077,801, Cl. 75-122.000.
Hutson, Jearld L. Technique for passivating semiconductor devices. 4,077,819, Cl. 148-188.000.
Hutterer, Robert: *See*—
Kiesewetter, Werner; Bernhardt, Emil; and Hutterer, Robert, 4,077,317, Cl. 101-37.000.
Hyde, Glenn F.; and Alban, Thomas W., to Koppers Company, Inc. Ceramic coated piston rings. 4,077,637, Cl. 277-235.00A.
Hydroacoustics Inc.: *See*—
Bouyoucos, John V., 4,077,304, Cl. 91-276.000.
Hyman, Sam M. Method and composition for treating trees using certain quaternary ammonium compounds. 4,078,087, Cl. 424-329.000.
I S A S.a.r.l.: *See*—
Crasnianski, Serge, 4,077,240, Cl. 70-360.000.
Ichikawa, Kiyoshi: *See*—
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,077,294, Cl. 84-1.230.
Ichikawa, Yoichi: *See*—
Suzuki, Matsumi; and Ichikawa, Yoichi, 4,078,154, Cl. 179-1.0SB.
Ideal Soap Co.: *See*—
Tanaka, Yoshio, 4,077,753, Cl. 425-131.100.
Idemitsu Kosan Company, Ltd.: *See*—
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.
Ihara Chemical Industry Co., Ltd.: *See*—
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, 4,078,045, Cl. 423-416.000.
Iida, Hiroshi: *See*—
Ohki, Yoshitaka; Iida, Hiroshi; Kumagai, Kenji; and Ishi, Taro, 4,077,210, Cl. 60-282.000.
Ikeda, Hiroshi: *See*—
Inamoto, Yoshiaka; Fujikura, Yoshiaka; Ikeda, Hiroshi; and Takaishi, Naotake, 4,078,085, Cl. 424-325.000.
Iliev, Iliya Marinov: *See*—
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.
Imai, Motoyuki: *See*—
Daimon, Nobutoshi; Izawa, Toichiro; and Imai, Motoyuki, 4,077,938, Cl. 260-37.0SB.
Imaizumi, Koji; and Shimizu, Shigemitsu, to Minolta Camera Kabushiki Kaisha. Wet type developing device for use in electrophotography. 4,077,712, Cl. 355-10.000.
Immonen, Kauko Ilmari. Device for removing the wearing surface of a tire. 4,077,733, Cl. 407-52.000.
Imperial Metal Industries (Kynoch) Limited: *See*—
Chase, Michael John, 4,077,495, Cl. 188-1.00C.
Inahashi, Kiichiro, to Kabushiki Kaisha Nippon Kijuki Seisakushio. Crane hook apparatus. 4,077,661, Cl. 294-83.00R.
Inamoto, Yoshiaka; Fujikura, Yoshiaka; Ikeda, Hiroshi; and Takaishi, Naotake, to Kao Soap Co., Ltd. 3-Aminomethyl-4-homoisotwistane and its salt and process for producing same. 4,078,085, Cl. 424-325.000.
Inayoshi, Akio: *See*—
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.
Incom International, Inc.: *See*—
Langford, William D., 4,077,636, Cl. 277-117.000.
Indesit Industria Elettrodomestici Italiana S.p.A.: *See*—
Campioni, Armando, 4,078,213, Cl. 325-459.000.
Industrial Mining Machinery Company: *See*—
Francis, Peter M., 4,077,574, Cl. 241-52.000.
Ing. C. Olivetti & C., S.p.A.: *See*—
Giolitti, Nicolo; and Bovio, Michele, 4,077,505, Cl. 197-1.00R.
Ingersoll-Rand Company: *See*—
Chen, Tze-Ning, 4,078,027, Cl. 261-116.000.
Inno-Cept Corporation: *See*—
Koch, Terry David, 4,077,732, Cl. 404-87.000.
Inomata, Hiroshi: *See*—
Sato, Yasuhiko; and Inomata, Hiroshi, 4,077,943, Cl. 260-46.5UA.
Inoue, Takehiko; Tabata, Junichi; Ohishi, Hidekatsu; and Murata, Seiichiro, to Hitachi Shipbuilding & Engineering Co., Ltd. Method of producing storage tank support block for low temperature liquified gas carrying vessels. 4,077,346, Cl. 114-74.00A.
Inoue, Yasuo, to Kanai, Hiroyuki. Automatic lubricators for rings of a spinning machine. 4,077,492, Cl. 184-64.000.
Inoue, Yoshihiro: *See*—
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, 4,077,615, Cl. 266-201.000.
Intercity Electric & Mechanical Services Ltd.: *See*—
May, Richard, 4,077,568, Cl. 237-8.00D.
International Business Machines Corporation: *See*—
Beausoleil, William F.; and Phelps, Byron E., 4,078,254, Cl. 364-900.000.
Bendz, Diana Jean; and Bendz, Gerald Andrei, 4,078,102, Cl. 427-341.000.
Carlson, Jeffrey Allen; Schwartz, Bradford Clyde; and Steving, Gerald, 4,077,558, Cl. 228-121.000.
Chen, Tien Chi; Eswaran, Kapali P.; Lum, Vincent Yu-Sun; and Tung, Chin, 4,078,260, Cl. 364-900.000.
Cortellino, Charles A., 4,078,098, Cl. 427-43.000.
De Bar, David E.; and De La Moneda, Francisco H., 4,078,243, Cl. 357-32.000.
Lee, Ho Chong, 4,078,238, Cl. 346-75.000.
Lindsey, Royce Darwin; and Smith, Larry Gene, 4,078,258, Cl. 364-900.000.
Schuessler, Philipp William Hans, 4,077,815, Cl. 148-23.000.
Tuckerman, Louis Bryant, III, 4,078,152, Cl. 178-22.000.
International Installations: *See*—
Storch, Adam, 4,077,665, Cl. 297-244.000.
International Nickel Company, Inc., The: *See*—
Larson, Jay Michael, 4,077,109, Cl. 29-420.000.
International Prototypes, Inc.: *See*—
Miller, Ronald Lee, 4,078,097, Cl. 427-34.000.
International Standard Electric Corporation: *See*—
Jessop, Anthony, 4,078,225, Cl. 340-146.1AG.
Moreau, Jean-Louis Yves Charles, 4,078,153, Cl. 178-69.100.
International Telephone and Telegraph Corporation: *See*—
Aronoff, Elihu J.; and Dhami, Kewal Singh, 4,078,114, Cl. 428-379.000.
Bradford, George J., 4,077,566, Cl. 236-46.00C.
Paladino, C. Alfred, 4,078,209, Cl. 331-47.000.
Steensma, Peter Dennis; and Kao, Charles Kuen, 4,077,701, Cl. 350-96.230.
Interpace Corporation: *See*—
Phelps, James D. M.; McElroy, Alan J.; and Caleca, Vincent, 4,078,184, Cl. 307-147.000.
Inuzuka, Tsuneki: *See*—
Komori, Shigehiro; Hattori, Hiroyuki; Inuzuka, Tsuneki; and Miyamoto, Koichi, 4,077,714, Cl. 355-51.000.
Invicta Plastics Limited: *See*—
Kindred, Michael, 4,077,630, Cl. 273-273.000.

Ioanesian, Jury Rolenovich: *See—*
Ioannesian, Rolen Arsenievich; Ioanesian, Jury Rolenovich; Paly, Polikarp Avtonomovich; Konstantinov, Leonid Pavlovich; and Vladislavlev, Jury Evgenievich, 4,077,482, Cl. 175-340.000.

Ioannesian, Rolen Arsenievich; Ioanesian, Jury Rolenovich; Paly, Polikarp Avtonomovich; Konstantinov, Leonid Pavlovich; and Vladislavlev, Jury Evgenievich. Three cone rock bit. 4,077,482, Cl. 175-340.000.

Irion, Leonhard: *See—*
Schabert, Hans-Peter; Irion, Leonhard; and Braun, Wolfgang, 4,077,837, Cl. 176-38.000.

Isermann, Howard P.; and Ciaudelli, Joseph P., to Van Dyk & Company, Incorporated. Sun screen compositions of unsaturated esters of p-dimethylaminobenzoic acid. 4,078,054, Cl. 424-60.000.

Ishi, Taro: *See—*
Ohki, Yoshitaka; Iida, Hiroshi; Kumagai, Kenji; and Ishi, Taro, 4,077,210, Cl. 60-282.000.

Ishii, Yohji: *See—*
Nakano, Soichi; Ishii, Yohji; Sekiya, Tetsuo; and Fujimura, Akira, 4,077,373, Cl. 123-117.00A.

Ishikawa, Katuichi; Sakakibara, Yuji; Sawada, Hiraki; and Otsubo, Kizuku, to Nissan Motor Company, Limited. Fuel vaporizer. 4,077,375, Cl. 123-122.0AB.

Isii, Sigeki: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,077,294, Cl. 84-1.230.

Isobe, Akio: *See—*
Suzuki, Suzuo; Isobe, Akio; and Matsuda, Kenichi, 4,077,209, Cl. 60-282.000.

Itek Corporation: *See—*
Greene, Robert I., 4,077,715, Cl. 355-57.000.

Ito, Katsumi: *See—*
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, 4,077,475, Cl. 172-3.000.

Ito, Toshimichi: *See—*
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.

Itoh, Takane, to Nissan Motor Company, Limited. Control system for a gas turbine engine. 4,077,204, Cl. 60-39.28R.

Iwamura, Kimihiko: *See—*
Kitamura, Ko; Watanabe, Mamoru; Iwamura, Kimihiko; and Chino, Kenichi, 4,078,166, Cl. 219-216.000.

Izaki, Hiroshi: *See—*
Ugata, Ken; Morita, Yasuji; Mine, Yasuharu; and Izaki, Hiroshi, 4,078,035, Cl. 264-221.000.

Izawa, Toichiro: *See—*
Daimon, Nobutoshi; Izawa, Toichiro; and Imai, Motoyuki, 4,077,938, Cl. 260-37.0SB.

Izon Corporation: *See—*
Waly, Adnan, 4,077,707, Cl. 353-27.00R.

J. I. Case Company: *See—*
Skahill, Richard John, 4,077,655, Cl. 280-756.000.

J. P. Stevens Co., Inc.: *See—*
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., 4,077,437, Cl. 139-116.000.

Jackson, Herman Roy. In process purification of dry cleaning solvents. 4,077,878, Cl. 210-59.000.

Jackson, William Wayne: *See—*
Steinbach, James Gerald; Rehn, Gary Allen; and Jackson, William Wayne, 4,077,651, Cl. 280-426.000.

Jacobsen, Norman T. Tamper indicating security device for drawers. 4,077,658, Cl. 292-307.00R.

Jagenberg-Werke AG: *See—*
Knuppertz, Heinz-Werner; and Lederer, Hans, 4,077,621, Cl. 271-33.000.

Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method for regulating combustion processes, particularly for the production of cement in a rotary kiln. 4,077,763, Cl. 432-14.000.

Jamak Incorporated: *See—*
Vogel, K. Stuart, 4,077,389, Cl. 126-190.000.

Jan Hardware Manufacturing Co., Inc.: *See—*
Lieberman, Lester; and Oddo, Ralph, 4,077,503, Cl. 192-18.00R.

Janome Sewing Machine Co., Ltd.: *See—*
Kasuga, Norboru, 4,077,341, Cl. 112-158.00B.

Japan Servo Co., Ltd.: *See—*
Fukuda, Tosao; and Takahashi, Hiroshi, 4,077,886, Cl. 210-198.00C.

Jaunin, Roland, to Hoffmann-La Roche Inc. Isoindole derivatives. 4,077,978, Cl. 260-326.100.

Jeff, Adolph L. Blade-breaking apparatus. 4,077,555, Cl. 225-103.000.

Jellinek, Thomas: *See—*
Bolza, Frederick; Jellinek, Thomas; Neill, Keith Gordon; and Tankey, Howard William, 4,077,820, Cl. 149-109.400.

Jenkins, Ellis H., to West Point Pepperell, Inc. Yarn clamp. 4,077,497, Cl. 188-65.100.

Jenkins, Vaughn Junior: *See—*
Anderson, David Robert; and Jenkins, Vaughn Junior, 4,078,193, Cl. 318-317.000.

Jeschke, Henning: *See—*
Frank, Werner; Jeschke, Henning; and Burkhardt, Gisbert, 4,077,620, Cl. 271-10.000.

Jessop, Anthony, to International Standard Electric Corporation. Arrangement and a method for error detection in digital transmission systems. 4,078,225, Cl. 340-146.1AG.

Jewett, Kathleen J.: *See—*
Geissler, Ulrich C.; Stith, William J.; and Jewett, Kathleen J., 4,077,772, Cl. 23-230.00B.

Jocsak, Richard: *See—*
Ziegenfus, Barry L.; and Jocsak, Richard, 4,077,327, Cl. 104-35.000.

Johnson, Anderson F., Jr.; Stork, Edward L.; and Winings, Richard H., to Westinghouse Electric Co., Inc. Apparatus for treating articles. 4,077,416, Cl. 134-159.000.

Johnson Controls, Inc.: *See—*
Matthews, Russell Byron, 4,077,762, Cl. 431-45.000.

Johnson, Dale Howard: *See—*
Shapiro, Sydney Harold; Johnson, Dale Howard; and Nemeth, Harold Charles, 4,078,105, Cl. 427-417.000.

Johnson, Eugene P., Jr., to Micro Communications Corporation. Arrangement for controlling the speed of a motor. 4,078,194, Cl. 318-331.000.

Johnson, Gordon Carlton: *See—*
Weinberg, Kurt; and Johnson, Gordon Carlton, 4,077,944, Cl. 260-75.00R.

Johnson, J. Walter; and Borchers, Herbert H., to Coastcom, Inc. System for multiplexing information channels adjacent to a video spectrum. 4,078,245, Cl. 358-86.000.

Johnson & Johnson: *See—*
Butterworth, George A. M.; and Elias, Robert T., 4,077,410, Cl. 128-287.000.
Sung, Pei; and Lee-You, James, 4,077,560, Cl. 228-220.000.

Johnson, Leighton Clifford, to Miles Laboratories, Inc. Disposable inoculation device and process of using same. 4,077,845, Cl. 195-103.50K.

Johnson, Lloyd M. Non-snagging sinker. 4,077,151, Cl. 43-43.120.

Johnson, Matthey & Co., Limited: *See—*
Acres, Gary James Keith; and Cooper, Barry John, 4,077,913, Cl. 252-462.000.

Johnson, Walter I.: *See—*
Enquist, Andrew N., 4,077,149, Cl. 43-19.200.

Johnson, William J., to Boston Gear Inc. Worm wheel. 4,077,274, Cl. 74-425.000.

Johnston, James Pyott; Tate, John Robert, deceased (by Tate, Mary, administrator); and by Tate, Sidney Alfred, administrator, to Procter & Gamble Company, The. Inhibiting dye transfer in washing or bleaching. 4,077,768, Cl. 8-107.000.

Johnston, John O'Neal: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,060, Cl. 424-242.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,061, Cl. 424-242.000.

Johnston, Ronald J. Extension leg for trusses for concrete forming structures and the like. 4,077,172, Cl. 52-111.000.

Jones, Herman L.; and Haugen, John H. Apparatus for producing a roll of photographic film prints having adhesive transfer tape backing. 4,077,827, Cl. 156-352.000.

Jones, William Raymond: *See—*
Starbuck, Herman S.; Jones, William Raymond; and Mahn, John Edward, 4,078,113, Cl. 428-196.000.

Joullie, Maurice: *See—*
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,082, Cl. 424-317.000.
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,090, Cl. 424-317.000.

Joyce, James J.: *See—*
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,727, Cl. 401-215.000.
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,807, Cl. 106-24.000.

Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, to Robert Bosch GmbH. Protective circuit for the ignition system of an internal combustion engine. 4,077,377, Cl. 123-148.00S.

Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, to Robert Bosch GmbH. Internal combustion engine semi-conductor ignition control system. 4,077,379, Cl. 123-148.00S.

Jurkovsky, Ivan Ivanovich: *See—*
Belolipetsky, Alexei Yakovlevich; Levochkin, Pavel Afanasievich; Jurkovsky, Ivan Ivanovich; and Kolomiets, Boris Makarovich, deceased, 4,077,589, Cl. 244-100.00A.

Kabushiki Kaisha Daini Seikosha: *See—*
Sakuma, Tadashi; and Hanaoka, Masatoshi, 4,077,199, Cl. 58-23.0BA.

Kabushiki Kaisha Gemvac: *See—*
Sakuma, Shinzo, 4,077,114, Cl. 29-622.000.

Kabushiki Kaisha Kawai Gakki Seisakusho: *See—*
Kondo, Nobuaki, 4,077,298, Cl. 84-454.000.
Uchiyama, Shigeru, 4,077,293, Cl. 84-1.010.

Kabushiki Kaisha Meidensha: *See—*
Sakuma, Shinzo, 4,077,114, Cl. 29-622.000.

Kabushiki Kaisha Mitutoyo Seisakusho: *See—*
Nishikata, Goro, 4,077,129, Cl. 33-147.00T.

Kabushiki Kaisha Nippon Kijuki Seisakushio: *See—*
Inahashi, Kiichiro, 4,077,661, Cl. 294-83.00R.

Kadar, Ferenc; and Galambos, Gyula, to REMIX Radiotechnikai Vallalat. Method of making the same electric slider. 4,077,115, Cl. 29-630.00B.

Kaeding, Warren W., to Mobil Oil Corporation. Selective production of para-xylene. 4,078,009, Cl. 260-673.000.

Kai, Tatsuya: *See*—
Udo, Isao; Kai, Tatsuya; and Kuwashiro, Masahiro, 4,077,614, Cl. 266-159.000.
Kaire, Jean-Claude: *See*—
Chapron, Claude; and Kaire, Jean-Claude, 4,078,199, Cl. 323-1.000.
Kaiser Aluminum & Chemical Corporation: *See*—
Grosso, Philip, 4,077,463, Cl. 165-1.000.
Kaji, Hidehiko: *See*—
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, to Kanebo Ltd. Pattern generating system. 4,078,253, Cl. 364-900.000.
Kalabin, Gennady Alexandrovich: *See*—
Trofimov, Boris Alexandrovich; Atavin, Alexandr Spiridonovich; Mikhaleva, Albina Ivanovna; Kalabin, Gennady Alexandrovich; and Chebatareva, Ekaterina Grigorievna, 4,077,975, Cl. 260-319.100.
Kali-Chemie Aktiengesellschaft: *See*—
Becher, Wilfried; and Massonne, Joachim, 4,078,043, Cl. 423-335.000.
Kaloi, Cyril M., to United States of America, Navy. Offset FED magnetic microstrip dipole antenna. 4,078,237, Cl. 343-700.0MS.
Kaman Sciences Corporation: *See*—
Church, Peter K.; and Knutson, Oliver J., 4,077,808, Cl. 106-40.00R.
Kamber, Paul, to LGZ Landis & Gyr Zug AG. Circuit for the parallel coupling of audio frequency central-control transmitting stations in a wave band filter construction. 4,078,216, Cl. 333-76.000.
Kamiya, Takashi; Tanaka, Kunihiko; Teraji, Tsutomu; and Hemmi, Keiji, to Fujisawa Pharmaceutical Co., Ltd. Aminoalkyl- or hydroxyalkyl-substituted thiadiazole derivatives. 4,077,965, Cl. 260-302.0SD.
Kamo, Hideo: *See*—
Akado, Hajime; Kamo, Hideo; and Nakane, Kazunori, 4,077,787, Cl. 55-419.000.
Kanai, Hiroyuki: *See*—
Inoue, Yasuo, 4,077,492, Cl. 184-64.000.
Kanamaru, Hisanobu: *See*—
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.
Kando, Akiyoshi; and Yoneya, Kiyoo, to Yoshida Kogyo K.K. Butt-joined carpet construction with stringer tapes. 4,078,109, Cl. 428-62.000.
Kanebo Ltd.: *See*—
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, 4,078,253, Cl. 364-900.000.
Kaneko, Yoshikazu; and Ogura, Hisashi, to West Electric Company, Ltd. Photographic flash device. 4,078,240, Cl. 354-33.000.
Kanisawa, Hajime; and Tanagawa, Korzi, to Oki Electric Industry Co., Ltd. Piezoelectric switching device. 4,078,187, Cl. 310-319.000.
Kao, Charles Kuen: *See*—
Steensma, Peter Dennis; and Kao, Charles Kuen, 4,077,701, Cl. 350-96.230.
Kao Soap Co., Ltd.: *See*—
Inamoto, Yoshiaka; Fujikura, Yoshiaka; Ikeda, Hiroshi; and Takaishi, Naotake, 4,078,085, Cl. 424-325.000.
Naganuma, Yoshinori; and Arai, Haruhiko, 4,078,055, Cl. 424-76.000.
Okumura, Takeo; Hayashi, Shizuo; Majima, Kanji; and Takei, Kensuke, 4,077,911, Cl. 252-550.000.
Karashima, Koji: *See*—
Nishino, Yasushi; Adachi, Saburo; and Karashima, Koji, 4,077,350, Cl. 114-260.000.
Karie, Earl K., to Brass Craft Manufacturing Company. Faucet valve and valve cartridge. 4,077,426, Cl. 137-454.600.
Karls, Robert F., to Emerson Electric Co. Instant hot water dispensing system. 4,077,545, Cl. 222-144.500.
Karol, Frederick John: *See*—
Noshay, Allen; and Karol, Frederick John, 4,077,904, Cl. 252-429.00R.
Kas, Gunter: *See*—
Haug, Heinz; and Kas, Gunter, 4,078,161, Cl. 200-19.00R.
Kasagi, Takao; Kuwakado, Satosi; and Takei, Toshihiro, to Nippon Soken, Inc. High pressure gas discharge valve device for safety air bags. 4,077,423, Cl. 137-68.00A.
Kasai, Toshiyuki, to Nippon Kogaku K.K. Spectroscopic auto ellipsometer. 4,077,720, Cl. 356-118.000.
Kasuga, Norboru, to Janome Sewing Machine Co., Ltd. Built in buttonholer for a sewing machine. 4,077,341, Cl. 112-158.00B.
Kato, Takashi, to Yoyota Jidosha Kogyo Kabushiki Kaisha. Carburetor. 4,078,025, Cl. 261-41.00D.
Kato, Tetsuji, to Mitsubishi Rayon Co., Ltd. Apparatus for continuously preparing a syrup of a monomer-polymer mixture. 4,077,755, Cl. 425-146.000.
Katz, Murray; and Kaufman, Arthur, to United Technologies Corporation. Method for catalyzing a fuel cell electrode and an electrode so produced. 4,078,119, Cl. 429-13.000.
Katzen, Sol. Process for producing an animal feed and fertilizer ingredient from animal manure. 4,078,094, Cl. 426-641.000.
Kauffman, Clarence B. Expansible camper. 4,077,662, Cl. 296-23.00G.
Kaufman, Arthur: *See*—
Katz, Murray; and Kaufman, Arthur, 4,078,119, Cl. 429-13.000.
Kaulen, Hans: *See*—
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Kazuhiro, Teramae: *See*—
Kuroki, Tomio; and Kazuhiro, Teramae, 4,077,771, Cl. 8-196.000.
Kearney & Trecker Corporation: *See*—
Hutchens, Morris L., 4,077,736, Cl. 408-16.000.
Kearns, Donald E.: *See*—
Boyce, W. David, Jr.; and Kearns, Donald E., 4,077,105, Cl. 29-278.000.
Keefer, Richard D., to Pittsfield Products, Inc. Cartridge filter construction. 4,078,036, Cl. 264-261.000.
Keely, W. A.; and Korneffel, R., to Teledyne Industries, Inc. Time modulated position controller. 4,077,738, Cl. 415-36.000.
Keiter, Edward F.: *See*—
Wyle, Frank S.; and Keiter, Edward F., 4,077,161, Cl. 51-98.00R.
Kelley, Eugene M. Pulling tool. 4,077,103, Cl. 29-259.000.
Kelly, Richard A., to Flinn & Dreffein Engineering Company. Power control circuit. 4,078,168, Cl. 219-497.000.
Kelsey-Hayes Co.: *See*—
Brown, Donald Dean; and Culp, Jere Sanders, 4,077,498, Cl. 188-72.200.
Kennametal Inc.: *See*—
Kita, John F., 4,077,734, Cl. 407-66.000.
Kero Metal Products Co., Inc.: *See*—
Bukaitz, Finley M., 4,077,686, Cl. 312-257.0SM.
Kersey, Carl H.; and Hansen, Charles D., to AMF Incorporated. Independently mounted thresher cutters. 4,077,573, Cl. 241-32.000.
Keske, Robert G., to Standard Oil Company. Amino substituted-4-t-butylphthalic acid esters. 4,078,142, Cl. 560-19.000.
Keslar, Leroy D.: *See*—
Bitterice, Michael G.; and Keslar, Leroy D., 4,078,107, Cl. 428-38.000.
Keuffel & Esser Company: *See*—
Erickson, Kent E., 4,077,132, Cl. 33-366.000.
Kevex Corporation: *See*—
Lowes, Albert Robert, 4,078,178, Cl. 250-336.000.
Kewanee Industries: *See*—
Prodo, Kenneth W.; and Bender, Robert W., 4,077,990, Cl. 260-404.500.
Keystone Automated Equipment Co.: *See*—
Andrews, Joseph J., 4,077,356, Cl. 118-301.000.
Khera, Surjit Singh, to Battelle Development Corporation. Catalyst for synthesizing low boiling aliphatic hydrocarbons from carbon monoxide and hydrogen. 4,077,907, Cl. 252-439.000.
Khera, Surjit Singh, to Battelle Development Corporation. Process for synthesizing low boiling aliphatic hydrocarbons from carbon monoxide and hydrogen. 4,077,995, Cl. 260-449.60M.
Khodorov, Alexandr Iosifovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.
Kienzle, Frank: *See*—
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,077,985, Cl. 260-346.600.
Kiesewetter, Werner; Bernhardt, Emil; and Hutterer, Robert, to Siemens Aktiengesellschaft. Apparatus for imprinting an elongated member. 4,077,317, Cl. 101-37.000.
Kilburn, Keith Douglas: *See*—
Baker, Richard Roland; Green, Sydney James; and Kilburn, Keith Douglas, 4,077,414, Cl. 131-8.00R.
Kim, He B.: *See*—
Driver, Michael C.; and Kim, He B., 4,077,111, Cl. 29-571.000.
Kimball, Everett L., to Ronson Corporation. Push-fit inlet valve assembly. 4,077,429, Cl. 137-588.000.
Kindred, Michael, to Invicta Plastics Limited. Board game. 4,077,630, Cl. 273-273.000.
King, Harry M.: *See*—
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.
King, John O., Jr. Fastener with removable pintail and locking collet. 4,077,299, Cl. 85-1.00P.
Kinnard, Kenneth F.: *See*—
Graham, Robert T., Jr.; Stevens, Robert M.; and Kinnard, Kenneth F., 4,077,718, Cl. 356-4.000.
Kinoshita, Mikio: *See*—
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, 4,077,475, Cl. 172-3.000.
Kiovsky, Thomas E., to Shell Oil Company. Star-shaped dispersant viscosity index improver. 4,077,893, Cl. 252-56.00R.
Kish, Calman J., to Fairmount Chemical Company, Inc. Tobacco sucker control agent and method. 4,077,796, Cl. 71-78.000.
Kishi, Ken, to Showa Vermiculite Kabushiki Kaisha. Method for manufacture of noncombustible, smokeless building composite material. 4,078,028, Cl. 264-43.000.
Kisslinger, Robert L.; Barnes, Benny B.; and Tuttle, Frederick L., to United States of America, Navy. Sensor transport system. 4,077,518, Cl. 206-583.000.
Kita, John F., to Kennametal Inc. Insert for mining tools and the like. 4,077,734, Cl. 407-66.000.

Kitajima, Akira: *See*—
Yoshida, Akitoshi; Kosaka, Masaharu; and Kitajima, Akira, 4,078,029, Cl. 264-63.000.

Kitamura, Ko; Watanabe, Mamoru; Iwamura, Kimihiko; and Chino, Kenichi, to Konishiroku Photo Industry, Co., Ltd. Device for controlling the temperature of the fixing means in the electronic photographic copying machine. 4,078,166, Cl. 219-216.000.

Kito, Hidetoshi, to Rank Xerox Ltd. Deactivating device for a magnetic brush developer used in a multicolor electrophotographic copying machine. 4,077,358, Cl. 118-658.000.

Kleinschmidt, Hans-Joachim; and Napierala, Gunter, to Gelenkwellenbau GmbH. Bearing arrangement for universal joints. 4,077,235, Cl. 64-17.00A.

Klessig, Clarence Edward, to Kohler Co. Actuating valve. 4,077,602, Cl. 251-25.000.

Klett, Gene R.; and Richardson, Warner G., to Caterpillar Tractor Co. Adjustable cutting edge assembly for a power earth mover. 4,077,142, Cl. 37-141.00R.

Kline, Richard H., to Goodyear Tire & Rubber Company, The. Bis(4-anilinophenoxy) ester antioxidants. 4,077,942, Cl. 260-45.85S.

Klink, Rainer: *See*—
Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, 4,077,900, Cl. 252-299.000.

Klinner, Wilfred Erwin; and Harris, Alan Winston, to National Research Development Corporation. Conditioning crops. 4,077,192, Cl. 56-16.400.

Kliot, Jules. Portable hand weaving loom. 4,077,436, Cl. 139-34.000.

Klisan, Inc.: *See*—
Dunbar, George W.; and Krumholz, Jerrold J., 4,077,153, Cl. 46-24.000.

Klockner-Humboldt-Deutz Aktiengesellschaft: *See*—
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,077,841, Cl. 159-47.00R.

Kluge, Erwin; and Becker, Burckhardt, to Volkswagenwerk Aktiengesellschaft. Gearshift lever assembly. 4,077,275, Cl. 74-473.00R.

Knapp, Mary M. Pipeline pig. 4,077,079, Cl. 15-104.06R.

Knochel, John R.: *See*—
Borcher, Thomas A.; and Knochel, John R., 4,077,754, Cl. 425-131.100.

Knollmueller, Karl O., to Olin Corporation. Method for the preparation of alkoxysilane cluster compounds. 4,077,993, Cl. 260-448.80R.

Knox, William G., Jr. Actuator lever lock for a four wheel drive vehicle transfer case. 4,077,276, Cl. 74-475.000.

Knuppertz, Heinz-Werner; and Lederer, Hans, to Jagenberg-Werke AG. Bottle labeling machine. 4,077,621, Cl. 271-33.000.

Knutson, Oliver J.: *See*—
Church, Peter K.; and Knutson, Oliver J., 4,077,808, Cl. 106-40.00R.

Ko, Keido: *See*—
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.

Kobe Dockyard & Engine Works, Ltd.: *See*—
Tamai, Shinkichi, 4,077,318, Cl. 101-37.000.

Kobe Steel, Ltd.: *See*—
Nishi, Satoru; and Tanaka, Katsumasa, 4,078,202, Cl. 324-61.00R.

Koch, Karl: *See*—
Hoyt, John M.; Koch, Karl; and Fischer, Joseph, 4,078,128, Cl. 526-10.000.

Koch, Terry David, to Inno-Cept Corporation. Insertion of compressible sheets in concrete. 4,077,732, Cl. 404-87.000.

Koert, James M.: *See*—
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,077,844, Cl. 195-80.00R.

Koether, Bernard G., to Food Automation-Service Techniques, Inc. Safety device for electrically and mechanically coupling a temperature-sensing probe to a timing computer. 4,077,690, Cl. 339-89.00R.

Koga, Masahiro: *See*—
Shimada, Keizo; Harada, Toshiaki; and Koga, Masahiro, 4,077,960, Cl. 260-281.0NH.

Kohler Co.: *See*—
Klessig, Clarence Edward, 4,077,602, Cl. 251-25.000.

Koizumi, Toshimichi; and Unami, Miwako, to Olympus Optical Co., Ltd. Reproducing objective for video disks. 4,077,704, Cl. 350-218.000.

Kolarov, Miladin Ivanov: *See*—
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.

Kolb, Alan C.: *See*—
Drummond, James E.; Mondelli, Alfred A.; and Kolb, Alan C., 4,077,782, Cl. 55-139.000.

Koll, Laurel A.; and Depew, Noel, to Mobilizer Medical Products, Inc. Separator assembly for transfer mechanisms. 4,077,073, Cl. 5-81.00R.

Kolomiets, Boris Makarovich, deceased: *See*—
Belolipetsky, Alexei Yakovlevich; Levochkin, Pavel Afanasievich; Jurkovsky, Ivan Ivanovich; and Kolomiets, Boris Makarovich, deceased, 4,077,589, Cl. 244-100.00A.

Kolomiets, Lidia Vasilivna, administrator: *See*—
Belolipetsky, Alexei Yakovlevich; Levochkin, Pavel Afanasievich; Jurkovsky, Ivan Ivanovich; and Kolomiets, Boris Makarovich, deceased, 4,077,589, Cl. 244-100.00A.

Komori, Shigehiro; Hattori, Hiroyuki; Inuzuka, Tsuneki; and Miyamoto, Koichi, to Canon Kabushiki Kaisha. Copying apparatus. 4,077,714, Cl. 355-51.000.

Kondo, Hiroyuki: *See*—
Takeshita, Hiroshi; and Kondo, Hiroyuki, 4,077,673, Cl. 303-24.00F.

Kondo, Nobuaki, to Kabushiki Kaisha Kawai Gakki Seisakusho. Apparatus for automatically tuning an electronic musical instrument. 4,077,298, Cl. 84-454.000.

Konishiroku Photo Industry, Co., Ltd.: *See*—
Kitamura, Ko; Watanabe, Mamoru; Iwamura, Kimihiko; and Chino, Kenichi, 4,078,166, Cl. 219-216.000.

Konnemann, Alfred; and Reinertz, Rudolf, to Grote & Hartmann. Conductor, claw, and method and apparatus for its production. 4,077,698, Cl. 339-276.00R.

Konno, Kazuhiko: *See*—
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.

Konstantinov, Leonid Pavlovich: *See*—
Ioannesian, Rolen Arsenievich; Ioanesian, Jury Rolenovich; Paly, Polikarp Avtonomovich; Konstantinov, Leonid Pavlovich; and Vladislavlev, Jury Evgenievich, 4,077,482, Cl. 175-340.000.

Koons, Russell E., to Lion Oil Company. Asphalt based compositions. 4,077,928, Cl. 260-28.5AS.

Koontz, Donald Eldridge; and Skurkiss, Peter Kenny, to Bell Telephone Laboratories, Incorporated. Selective gold plating. 4,077,852, Cl. 204-15.000.

Koopmann, Adolf: *See*—
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, 4,077,708, Cl. 353-27.00R.

Kopp, Clinton V.: *See*—
Cromie, Harry W.; Fitzgerald, James A.; Kopp, Clinton V.; and Washington, Freddie L., 4,077,578, Cl. 242-18.00G.

Koppers Company, Inc.: *See*—
Hyde, Glenn F.; and Alban, Thomas W., 4,077,637, Cl. 277-235.00A.

Koppers, Manfred; and Pawelski, Ludwig, to Rheinstahl AG. Roof support shield structure for use in an excavation. 4,077,223, Cl. 61-45.00D.

Korasiak, Wolfgang: *See*—
Leiber, Heinz; Gerstenmeier, Jurgen; and Korasiak, Wolfgang, 4,077,675, Cl. 303-95.000.

Korneffel, R.: *See*—
Keely, W. A.; and Korneffel, R., 4,077,738, Cl. 415-36.000.

Korot, Garri Moiseevich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Kortenbach & Rauh Kommanditgesellschaft: *See*—
Schultes, Tilmann; and Seidel, Joachim, 4,077,420, Cl. 135-25.00R.
Schultes, Tilmann; and Seidel, Joachim, 4,077,421, Cl. 135-25.00R.

Kosaka, Masaharu: *See*—
Yoshida, Akitoshi; Kosaka, Masaharu; and Kitajima, Akira, 4,078,029, Cl. 264-63.000.

Kosoczky, Ibolya: *See*—
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.

Kotter, James I.; Hassenboehler, Charles B.; and Folk, Craig L., to United States of America, Agriculture. Fiber dispersing and feeding apparatus for open end spinning. 4,077,196, Cl. 57-58.950.

Kottke, Roger H.: *See*—
Sanderson, Frank Thomas; Kowalski, Alexander; and Kottke, Roger H., 4,077,926, Cl. 260-29.6TA.

Kowalski, Alexander: *See*—
Sanderson, Frank Thomas; Kowalski, Alexander; and Kottke, Roger H., 4,077,926, Cl. 260-29.6TA.

Koychev, Todor Yankov: *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Kozacka, Frederick J., to Gould, Inc. Load-break switch and current-limiting fuse combination. 4,078,221, Cl. 337-168.000.

Kozdal, Emil. Trouser garments. 4,077,067, Cl. 2-234.000.

Kraftwerk Union Aktiengesellschaft: *See*—
Peehs, Martin; and Hunner, Manfred, 4,077,839, Cl. 176-78.000.
Schabert, Hans-Peter; Irion, Leonhard; and Braun, Wolfgang, 4,077,837, Cl. 176-38.000.

Kramer, Charles E., to Celanese Corporation. Halogenated aromatic polymer/metal phosphinate polymer flame retardant composition. 4,078,016, Cl. 260-860.000.

Kramer, Erich: *See*—
Bleck, Wolf-Eckhard; Nickel, Horst; and Kramer, Erich, 4,077,767, Cl. 8-85.00R.

Kramer, Roelof Pieter: *See*—
Theunissen, Matthias Johannes Joseph; Kramer, Roelof Pieter; and Peek, Hermanus Leonardus, 4,077,112, Cl. 29-580.000.

Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., to Lacy, Gordon S. Ball pen ink cartridges containing inks which do not form crystalline masses within copper or copper alloys. 4,077,727, Cl. 401-215.000.

Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., to

Lacy, Gordon S. Ball pen inks which do not form clogging crystalline masses within copper or copper alloy ink cartridges. 4,077,807, Cl. 106-24.000.

Kramm, David Edward: *See—*
Moyer, Joseph Donald; and Kramm, David Edward, 4,078,118, Cl. 428-521.000.

Krapcho, John, to E. R. Squibb & Sons, Inc. Substituted 2H-1,4-benzothiazin-3(4H)-ones. 4,078,062, Cl. 424-246.000.

Krause, Joachim: *See—*
Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, 4,077,900, Cl. 252-299.000.

Kreidler, Alfred; and Viessmann, Klaus. Method for thermally treating metal components. 4,077,814, Cl. 148-13.200.

Kremer, Fontaine Theodore, Jr.; and Ramsey, Harold Eugene, to Du Pont de Nemours, E. I., and Company. Package-making apparatus. 4,077,184, Cl. 53-112.00A.

Kremer, Richard D., to Carl Schleicher & Schull. Collodion bag concentration accelerator and sampler. 4,077,875, Cl. 210-23.00F.

Kremer, Stephen D.: *See—*
Swanson, Wyn K.; and Kremer, Stephen D., 4,078,229, Cl. 340-173.0CM.

Kress, James Henry; and Michael, Richard Arlo, to Deere & Company. Transmission. 4,077,280, Cl. 74-760.000.

Kress, James Henry, to Deere & Company. Transmission. 4,077,282, Cl. 74-760.000.

Kresse, Heinz: *See—*
Haerten, Rainer; and Kresse, Heinz, 4,077,405, Cl. 128-214.00F.

Krestenyakov, Yordan Ivanov: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Krokos, Raymond M., to Evans Products Company. Automobile tie down assembly. 4,077,332, Cl. 105-477.000.

Krumholz, Jerrold J.: *See—*
Dunbar, George W.; and Krumholz, Jerrold J., 4,077,153, Cl. 46-24.000.

Krupicka, Rudolf. Composition for favoring germination and growth of the vegetable species and its application. 4,077,793, Cl. 71-7.000.

Krupp-Koppers GmbH: *See—*
Lorrek, Johannes; and Lorrek, Josef, 4,077,136, Cl. 34-62.000.

Kryczun, Alfred: *See—*
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,077,841, Cl. 159-47.00R.

Kubokawa, Masaharu. Ball holder. 4,077,514, Cl. 206-315.00B.

Kubota, Ltd.: *See—*
Bando, Mitsuru; and Aoki, Shun, 4,077,622, Cl. 271-183.000.
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, 4,077,615, Cl. 266-201.000.
Ugata, Ken; Morita, Yasuji; Mine, Yasuharu; and Izaki, Hiroshi, 4,078,035, Cl. 264-221.000.

Kubota Tekko Kabushiki Kaisha: *See—*
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, 4,077,475, Cl. 172-3.000.

Kuhls, Jurgen; Steininger, Alfred; and Fitz, Herbert, to Hoechst Aktiengesellschaft. Process for the manufacture of suspension polymers of tetrafluoroethylene. 4,078,134, Cl. 526-204.000.

Kuhls, Jurgen: *See—*
Sulzbach, Reinhard; Kuhls, Jurgen; and Fitz, Herbert, 4,078,135, Cl. 526-209.000.

Kulikowski, Donald F.; Richie, Kenneth E.; and Pan, Peter N. Y., to Continental Can Company, Inc. Propellantless aerosol container. 4,077,543, Cl. 222-95.000.

Kulka, Kurt; Zazula, Teodosij; and Yurecko, John M., to Fritzsche Dodge & Olcott Inc. Hexyloxyacetonitrile perfume compositions. 4,077,916, Cl. 252-522.000.

Kulkarni, Avinash D.: *See—*
Martin, Jack; and Kulkarni, Avinash D., 4,078,188, Cl. 313-222.000.

Kulp, Gary: *See—*
Rhoades, John Stewart; and Kulp, Gary, 4,077,888, Cl. 250-543.000.
Rhoades, John Stewart; and Kulp, Gary, 4,077,889, Cl. 250-543.000.

Kumagai, Kenji: *See—*
Ohki, Yoshitaka; Iida, Hiroshi; Kumagai, Kenji; and Ishi, Taro, 4,077,210, Cl. 60-282.000.

Kumar, Tribhawan; and Morey, Booker W., to Occidental Petroleum Corporation. Separation of colored particulate glass. 4,077,871, Cl. 209-4.000.

Kunchev, Nikola Tzanov: *See—*
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.

Kunstmann, Rudolf: *See—*
Lerch, Ulrich; Babej, Milos; Bartmann, Wilhelm; and Kunstmann, Rudolf, 4,078,081, Cl. 424-305.000.

Kunze, Dieter; Wolf, Horst-Wolfgang; and Parstorfer, Richard, to Siemens Aktiengesellschaft. Splicing element for connection of individual light waveguides. 4,077,702, Cl. 350-96.210.

Kupcikevicius, Vytautas: *See—*
Frey, Paul Howard; and Kupcikevicius, Vytautas, 4,077,090, Cl. 17-41.000.

Kuroda, Nobuyuki: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,078,006, Cl. 260-621.00G.

Kuroki, Tomio; and Kazuhiro, Teramae, to Toyo Boseki Kabushiki Kaisha. Process for treating fibrous material. 4,077,771, Cl. 8-196.000.

Kurt, Lynn Edward: *See—*
Thompson, Warren Lynn; and Kurt, Lynn Edward, 4,077,447, Cl. 144-34.00E.

Kuspert, John C.: *See—*
Snellman, Donald L.; and Kuspert, John C., 4,077,078, Cl. 11-1.0AD.
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., 4,077,831, Cl. 156-563.000.

Kutz, Hugo Joseph, deceased; and by Kutz, Thomas A., executor. Sealed cartridge valve assembly. 4,077,605, Cl. 251-335.00A.

Kutz, Thomas A., executor: *See—*
Kutz, Hugo Joseph, deceased; and Kutz, Thomas A., executor, 4,077,605, Cl. 251-335.00A.

Kuwakado, Satosi: *See—*
Kasagi, Takao; Kuwakado, Satosi; and Takei, Toshihiro, 4,077,423, Cl. 137-68.00A.

Kuwashiro, Masahiro: *See—*
Udo, Isao; Kai, Tatsuya; and Kuwashiro, Masahiro, 4,077,614, Cl. 266-159.000.

Kyodo Chemical Company, Ltd.: *See—*
Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, 4,077,971, Cl. 260-308.00B.

Kysela, Ernst: *See—*
Lantzsch, Reinhard; Arlt, Dieter; and Kysela, Ernst, 4,078,008, Cl. 260-655.000.

Lacroix, Laurent, to Philagro. Agricultural fungicidal composition. 4,078,069, Cl. 424-272.000.

Lacroix, Roger; Wacker, Manfred; and Lambert, Claude, to Comptoir Lyon-Alemand-Louyot. Element for detecting the presence of combustible gases in a gaseous atmosphere. 4,077,775, Cl. 23-254.00E.

Lacy, Gordon S.: *See—*
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,727, Cl. 401-215.000.
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,807, Cl. 106-24.000.

Ladd Tool Sales Co., Inc.: *See—*
Boyce, W. David, Jr.; and Kearns, Donald E., 4,077,105, Cl. 29-278.000.

Lafont, Raymond, to B.S.G. International Limited. Self-regulating device for the automatic locking of safety belt winding reels. 4,077,584, Cl. 242-107.40A.

Lafrance, Conrad Damien: *See—*
Botros, Radamis; and Lafrance, Conrad Damien, 4,078,155, Cl. 179-1.0CN.

Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, to S.A. Joullie International. Mucolytically effective agents. 4,078,082, Cl. 424-317.000.

Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, to S.A. Joullie International. (Carboxymethylthio)acetic acid and salts thereof used as mucolytic agents. 4,078,090, Cl. 424-317.000.

Lamb Industries, Inc.: *See—*
Callegari, Stephen R.; Moncus, James D.; and Harper, Roland George, Jr., 4,077,525, Cl. 214-2.500.

Lambert, Claude: *See—*
Lacroix, Roger; Wacker, Manfred; and Lambert, Claude, 4,077,775, Cl. 23-254.00E.

Lammer, Jurgen: *See—*
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.

Lancaster, Patrick R., III: *See—*
Lancaster, William G.; and Lancaster, Patrick R., III, 4,077,179, Cl. 53-32.000.

Lancaster, William G.; and Lancaster, Patrick R., III. Automatic wrapping apparatus. 4,077,179, Cl. 53-32.000.

Land, Cecil E.: *See—*
EerNisse, Errol P.; Land, Cecil E.; and Snelling, Jay B., 4,078,226, Cl. 340-146.3SY.

Lang, Rainer; Matthiesen, Horst; and Rubruck, Manfred, to Siemens Aktiengesellschaft. Method for controlling the on-the-fly splicing of a web from a second roll to a web running off a first roll. 4,077,580, Cl. 242-58.200.

Lang Research Corporation: *See—*
Hodgkinson, Robert, 4,077,269, Cl. 74-60.000.

Langan, Marion J., to Avco Corporation. Drift cancellation circuit for multiplexer amplifier. 4,078,156, Cl. 179-15.0BL.

Langdon, William Keith; and Dutton, Daniel Ronan, to BASF Wyandotte Corporation. Glycol antifreeze mixtures. 4,077,894, Cl. 252-76.000.

Langdon, William Keith; and Dutton, Daniel Ronan, to BASF Wyandotte Corporation. Glycol antifreeze mixtures. 4,077,895, Cl. 252-76.000.

Lange, Howard G., to Zenith Radio Corporation. Apparatus for making a color selection mask for a color cathode ray tube. 4,077,717, Cl. 355-133.000.

Langer, Arthur W., Jr., to Exxon Research & Engineering Co. Process for polymer lithiation in graft polymerization. 4,078,019, Cl. 260-880.00R.

Langer, Heimo J.; and McKillip, William J., to Ashland Oil, Inc. Bonding of rubber to reinforcing elements. 4,078,115, Cl. 428-395.000.

Langford, William D., to Incom International, Inc. Self-aligning cable rod seal. 4,077,636, Cl. 277-117.000.

Langrenne, Albert: *See*—
Berthoux, Jean Louis; and Langrenne, Albert, 4,078,246, Cl. 360-133.000.

Langvik, Sigmund Coll. Filter disc for vacuum filter system. 4,077,887, Cl. 210-331.000.

Lantzsch, Reinhard; Arlt, Dieter; and Kysela, Ernst, to Bayer Aktiengesellschaft. Process for the preparation of dienes. 4,078,008, Cl. 260-655.000.

Larsen, Ole Jeppe Fjord. System for depositing and protecting sand on the floor of a sea, or other body of water. 4,077,222, Cl. 61-3.000.

Larson, E. Virgil, to University of Minnesota, Regents of the. Method of freezing liquid material in which agglomeration is inhibited. 4,077,227, Cl. 62-74.000.

Larson, Jay Michael, to International Nickel Company, Inc., The. Hot working of metal powders. 4,077,109, Cl. 29-420.000.

Lauer, Jay M., to Teledyne Industries, Inc. Polarographic sensor. 4,077,861, Cl. 204-195.00P.

Lauria, Francesco: *See*—
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.

Lavigne, Joe B., to Chevron Research Company. Lactones and ester derivatives thereof. 4,078,144, Cl. 560-126.000.

Lawrence Peska Associates, Inc.: *See*—
Chestney, James K., 4,077,629, Cl. 273-101.000.

Lay nee Konya, Aranka: *See*—
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.

Lazear, Nelson R.: *See*—
Costanza, John R.; Conciatori, Anthony B.; and Lazear, Nelson R., 4,077,859, Cl. 204-159.230.

Le Ciment Arme Demay Freres: *See*—
de Leaumont, Jean, 4,077,174, Cl. 52-259.000.

Leach, Bruce E., to Continental Oil Company. Process for preparing Zeolite A. 4,078,042, Cl. 423-329.000.

Leach, Clayton R., Jr., to Fairmont Steel Products, Inc. Cushioning means for goose neck hitch. 4,077,650, Cl. 280-423.00R.

Lebus International, Inc.: *See*—
Broehl, Anton, 4,077,348, Cl. 114-200.000.

Lechevallier, Claude, to Compagnie Industrielle des Piles Electroniques "CIPEL". Electric cell. 4,078,126, Cl. 429-166.000.

Lecolier, Serge L.; and Biehler, Jean-Marie J., to Societe Nationale des Poudres et Explosifs. Carbamate-phosphonates, and process of preparation. 4,077,964, Cl. 260-293.860.

Lederer, Hans: *See*—
Knuppertz, Heinz-Werner; and Lederer, Hans, 4,077,621, Cl. 271-33.000.

Lee, Gim Fun, Jr., to General Electric Company. Method of preparing compositions that comprise a polyphenylene ether resin and an alkenyl aromatic resin. 4,077,934, Cl. 260-30.60R.

Lee, Ho Chong, to International Business Machines Corporation. Magnetic deflector for a magnetic ink jet printer. 4,078,238, Cl. 346-75.000.

Lee-You, James: *See*—
Sung, Pei; and Lee-You, James, 4,077,560, Cl. 228-220.000.

Leemann, Karl, to Etablissement Financier et Industriel Intersub. Depth Gauge. 4,077,257, Cl. 73-300.000.

Lefevre, Jean: *See*—
Mathern, Guy; Lefevre, Jean; Tricot, Roland; and Guessier, Andre, 4,077,108, Cl. 29-403.000.

Leiber, Heinz, to Teldix GmbH. Two-circuit master cylinder unit for brakes. 4,077,217, Cl. 60-535.000.

Leiber, Heinz; Gerstenmeier, Jurgen; and Korasiak, Wolfgang, to Teldix GmbH. Antilocking control system. 4,077,675, Cl. 303-95.000.

Leidich, Arthur John, to RCA Corporation. Push-pull transistor amplifier with driver circuitry providing over-current protection. 4,078,207, Cl. 330-273.000.

Leinbach, Richard Klein: *See*—
Ward, John William; and Leinbach, Richard Klein, 4,077,710, Cl. 355-3.00R.

Leitheiser, Robert H.; and Peloza, Casimir C., to Ashland Oil, Inc. Thermoset water-in-oil emulsions. 4,077,931, Cl. 260-29.6NR.

Leitheiser, Robert H.; and Szwarc, John J., to Freeman Chemical Corporation. Copolymerizable compositions and method of making the same. 4,078,015, Cl. 260-859.00R.

Lelke, Helmut; Howard, Richard A.; Forte, John A., Jr.; and Levinthal, Jay G., to Raytheon Company. Digital display composition system. 4,078,249, Cl. 364-200.000.

Lems, Peter; and Cheung, Nelson, to Signode Corporation. Method of tensioning and joining a formed strap loop about a package. 4,077,313, Cl. 100-2.000.

Lender, Adam; and Olszanski, Henry H., to GTE Automatic Electric Laboratories Incorporated. Method and apparatus for regenerating a modified duobinary signal. 4,078,157, Cl. 179-16.0EA.

Lender, Adam; and Olszanski, Henry H., to GTE Automatic Electric Laboratories Incorporated. Modified duobinary repeatered span line. 4,078,159, Cl. 178-68.000.

Leonard, Arden: *See*—
Carter, Coleman J.; and Leonard, Arden, 4,077,595, Cl. 248-210.000.

Lepers, Heinrich: *See*—
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.

Lepert, Andre. "Process for preparing petroleum resins having low softening points and narrow molecular weight ranges". 4,078,132, Cl. 526-76.000.

Lerch, Ulrich; Babej, Milos; Bartmann, Wilhelm; and Kunstmann, Rudolf, to Hoechst Aktiengesellschaft. Cyclopentane derivatives manufacture. 4,078,081, Cl. 424-305.000.

Lerch, Ulrich: *See*—
Babej, Milos; Bartmann, Wilhelm; and Lerch, Ulrich, 4,078,083, Cl. 424-317.000.

Le Roy, Pierre L., to New Research and Development Laboratories, Inc. Cranial transillumination device. 4,077,399, Cl. 128-23.000.

Lester Laboratories, Inc.: *See*—
Peters, John P.; and McAmish, Larry H., 4,077,914, Cl. 252-518.000.

Levek, Robert P.; and Heath, Perry C., to Great Lakes Chemical Corporation. Thixotropic fumigant compositions containing liquid haloaliphatic hydrocarbon. 4,078,089, Cl. 424-349.000.

Lever Brothers Company: *See*—
Mazzola, Louis R., 4,078,099, Cl. 427-213.000.

Levine, Robert Aaron: *See*—
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III, 4,077,396, Cl. 128-2.00F.

Levinthal, Jay G.: *See*—
Lelke, Helmut; Howard, Richard A.; Forte, John A., Jr.; and Levinthal, Jay G., 4,078,249, Cl. 364-200.000.

Levochkin, Pavel Afanasievich: *See*—
Belolipetsky, Alexei Yakovlevich; Levochkin, Pavel Afanasievich; Jurkovsky, Ivan Ivanovich; and Kolomiets, Boris Makarovich, deceased, 4,077,589, Cl. 244-100.00A.

Lewiner, Jacques; and Dreyfus, Gerard, to Agence Nationale de Valorisation de la Recherche (ANVAR). Control devices of the relay type. 4,078,183, Cl. 307-112.000.

Lewis, Gary Brett, to Du Pont de Nemours, E. I., and Company. Air gage spinning process. 4,078,034, Cl. 264-181.000.

Lewis, Kim R.; and Corbett, William H., to NCR Corporation. Paper drive mechanism. 4,077,581, Cl. 242-67.30R.

Lewis, Meirion Francis, to National Research Development Corporation. Multi-moded acoustic wave oscillator. 4,078,210, Cl. 331-107.00A.

Leyrat, Pierre Jean; and Baconet, Daniel Diony, to Societe Anonyme: Poclain. Excavator bucket and ripper tooth assembly. 4,077,529, Cl. 214-145.00R.

LGZ Landis & Gyr Zug AG: *See*—
Kamber, Paul, 4,078,216, Cl. 333-76.000.

Li, George S., to Standard Oil Company. Terpolymers comprising olefinic nitriles, N-vinylimides and indene or coumarone and process for preparing the compositions. 4,077,947, Cl. 260-78.0UA.

Liaaen, Anders Marius, to A. M. Liaaen A/S. Vessel propulsion and/or steering means. 4,077,352, Cl. 115-35.000.

Libbey-Owens-Ford Company: *See*—
Calevro, Torino E.; and Hagedorn, Floyd T., 4,077,792, Cl. 65-288.000.
Oelke, Waldemar W., 4,077,791, Cl. 65-273.000.

Libit, Sidney M. One piece dispensing closure. 4,077,537, Cl. 215-253.000.

Licentia Patent-Verwaltungs-GmbH: *See*—
Frank, Werner; Jeschke, Henning; and Burkhardt, Gisbert, 4,077,620, Cl. 271-10.000.

Lichenstein, Betty A.: *See*—
Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, William M., Jr., 4,077,106, Cl. 29-792.000.

Lichtenberger, Gunter J.; and Morgan, George W., to Sun Oil Company Limited. Apparatus for ice disaggregation. 4,077,225, Cl. 61-103.000.

Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, William M., Jr., to Lichenstein, Betty A. Pallet making assembly. 4,077,106, Cl. 29-792.000.

Lidstrom, Thony Gote, to Nilcon Engineering AB. Reinforcement elements for elongate concrete building blocks manufactured by sliding form casting and a method and a machine to produce such elements. 4,077,440, Cl. 140-105.000.

Lieberman, Lester; and Oddo, Ralph, to Jan Hardware Manufacturing Co., Inc. Knob and control shaft assembly. 4,077,503, Cl. 192-18.00R.

Liljedahl, Trygve, to Trygve Liljedahl Skistavfabrikk A/S. Strap adjusting device. 4,077,091, Cl. 24-77.00R.

Lim, Sim Koei; Bloomquist, Arnold Eugene; and Schaper, Raymond Joseph, to Calgon Corporation. Self-inverting emulsions of dialkyldiallyl ammonium chloride polymers and copolymers. 4,077,930, Cl. 260-29.6TA.

Lind, Earl V., to Schlegel Corporation. Pile weatherseal enclosed in U-shaped tube. 4,078,106, Cl. 428-35.000.

Lind, Robert B., to Gerber Products Company. Apparatus for handling glass jars. 4,077,826, Cl. 156-350.000.

Linde Aktiengesellschaft: *See*—
Nasser, Gamal El Din, 4,077,863, Cl. 204-268.000.
Stuhr, Hans Waldemar, 4,077,305, Cl. 91-486.000.

Lindemann Maschinenfabrik GmbH: *See*—
Tillmanns, Josef, 4,077,575, Cl. 241-285.00A.

Lindemer, Terrence B.; Long, Ernest L., Jr.; and Beatty, Ronald L., to United States of America, Energy. Pyrolytic carbon-coated nuclear fuel. 4,077,838, Cl. 176-68.000.

Lindmark, Karl Lewis, to Chemetron Corporation. Rail straightening press. 4,077,248, Cl. 72-389.000.

Lindsey, Royce Darwin; and Smith, Larry Gene, to International Business Machines Corporation. System for arranging and sharing shift register memory. 4,078,258, Cl. 364-900.000.

Lindstrom, Olle Birger. Stabilized iron electrodes. 4,078,120, Cl. 429-27.000.

Lion Oil Company: *See—*
Hutchison, Charles Bryce, 4,078,117, Cl. 428-446.000.
Koons, Russell E., 4,077,928, Cl. 260-28.5AS.

Lippsmeier, Bernd; Roszinski, Hilmar; and Stephan, Hans-Werner, to Hoechst Aktiengesellschaft. Production of O,O-dialkylthionophosphoric acid chlorides. 4,078,023, Cl. 260-986.000.

Liuzzo, Christy N., to Valley National Bank. Document holder. 4,077,323, Cl. 101-407.00R.

Livingston, Almer K. Apparatus for collecting objects from a surface. 4,077,194, Cl. 56-328.00R.

Lobeck, Walter G., Jr.: *See—*
Wu, Yao Hua; and Lobeck, Walter G., Jr., 4,077,959, Cl. 260-279.00R.

Loffet, Albert, to U C B Societe Anonyme. L-pyroglutamyl-L-prolinamide. 4,077,951, Cl. 260-112.50R.

Logisticon, Inc.: *See—*
Blakeslee, Thomas R.; and Francy, James R., 4,077,486, Cl. 180-79.100.

Logwin, John R., to Celanese Corporation. Splice for use during the thermal stabilization of a flat multifilament band of an acrylic fibrous material comprising at least two segments. 4,077,822, Cl. 156-157.000.

Loken, Per A., to Myrens Verksted A/S. Procedure for dehydrating and drying fine-grained products and in addition a device to be used for the execution of the procedure. 4,077,133, Cl. 34-17.000.

Long, Ernest L., Jr.: *See—*
Lindemer, Terrence B.; Long, Ernest L., Jr.; and Beatty, Ronald L., 4,077,838, Cl. 176-68.000.

Longman, Millard D., Jr., to Coulter Electronics, Inc. Method and apparatus for balancing particle detecting signals generated in a particle study device having multiple apertures. 4,078,211, Cl. 324-71.0CP.

Loper, Vernon L. Coded charm device. 4,077,237, Cl. 63-31.000.

L'Oreal: *See—*
Pomot, Jean; and Chalaye, Jean-Philippe, 4,078,051, Cl. 424-35.000.

Lorenz, Jurgen; and Mehdorn, Frank, to Spinnstoffabrik Zehlendorf Aktiengesellschaft. Filtration of a liquid. 4,077,880, Cl. 210-65.000.

Lorrek, Johannes; and Lorrek, Josef, to Krupp-Koppers GmbH. Ring shaped cooling device. 4,077,136, Cl. 34-62.000.

Lorrek, Josef: *See—*
Lorrek, Johannes; and Lorrek, Josef, 4,077,136, Cl. 34-62.000.

Lothmann, Joseph, to United States Steel Corporation. Sliding gate spring loading toggle. 4,077,552, Cl. 222-600.000.

Lotte, Andre: *See—*
Weber, Roger; and Lotte, Andre, 4,077,320, Cl. 101-119.000.

Lotzsch, Ulrich; and Schuster, Heinz, to Varta Batterie Aktiengesellschaft. Battery terminal construction. 4,078,122, Cl. 429-121.000.

Lovelady, Grady R. Servicing rack for motorcycles. 4,077,607, Cl. 254-88.000.

Lovqvist, Karl Bo Lennart. Collecting device for refuse, dust etcetera. 4,077,563, Cl. 232-43.200.

Lowes, Albert Robert, to Kevex Corporation. Dynamic background subtraction circuit. 4,078,178, Cl. 250-336.000.

Lowson, Martin Vincent; Hawkings, David Leonard; Byham, Geoffrey Malcolm; and Perry, Frederick John, to Westland Aircraft Limited. Helicopter rotor blades. 4,077,741, Cl. 416-228.000.

Luder, Gunther: *See—*
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, 4,077,708, Cl. 353-27.00R.

Ludwig, Peter: *See—*
Pietschmann, Peter; and Ludwig, Peter, 4,078,136, Cl. 526-331.000.

Lum, Vincent Yu-Sun: *See—*
Chen, Tien Chi; Eswaran, Kapali P.; Lum, Vincent Yu-Sun; and Tung, Chin, 4,078,260, Cl. 364-900.000.

Lumma, William C., Jr.; and Saari, Walfred S., to Merck & Co., Inc. Piperazinylpyridines. 4,078,063, Cl. 424-250.000.

Lummus Company, The: *See—*
Snell, George J., 4,077,881, Cl. 210-83.000.

Lummus Industries, Inc.: *See—*
Van Doorn, Donald W.; and Harmon, William A., 4,077,531, Cl. 214-309.000.

Lund, Olav Gerhard. Arrangement in steerable slide-trays. 4,077,638, Cl. 280-21.00R.

Lux, Phil. Awning apparatus for travel trailers, mobile homes, and the like. 4,077,419, Cl. 135-5.0AT.

Luzzani, Umberto; and Riva, Giuseppe. Extensible table. 4,077,335, Cl. 108-75.000.

Lyadysheva, Evgenia Konstantinovna: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.

Lyall Electric, Inc.: *See—*
McKeever, Carl W., 4,077,118, Cl. 29-748.000.

Lynes, Inc.: *See—*
Balkanli, Hayati, 4,078,232, Cl. 340-347.00P.
Coone, Malcolm G., 4,077,224, Cl. 61-94.000.

Lyubenov, Hristo Krumov: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Mac Farlane, John Hartley Trevor, to Post Office, The. Threading device and method of threading. 4,077,609, Cl. 254-134.3FT.

Macotech Corporation: *See—*
Mathias, Richard A.; Adams, Lyle C.; and Miller, Edward N., 4,078,195, Cl. 318-561.000.

Maddox, Jim, Jr.: *See—*
Shupe, Russell D.; and Maddox, Jim, Jr., 4,077,471, Cl. 166-275.000.

Mader, Helmut, to Dr. Kern GmbH. Radiation apparatus with reflector casing. 4,078,181, Cl. 250-495.000.

Maeda, Riichi, to Nissan Motor Company, Limited. External heat engine. 4,077,221, Cl. 60-650.000.

Maeda, Ryozo; and Hirose, Katsumi, to Shionogi & Co., Ltd. Thiazole derivatives. 4,077,968, Cl. 260-306.80R.

Mahn, John Edward: *See—*
Starbuck, Herman S.; Jones, William Raymond; and Mahn, John Edward, 4,078,113, Cl. 428-196.000.

Maidon, Rene Louis, to Etudes et Fabrications Aeronautiques. Jumping suit for a parachutist. 4,077,064, Cl. 2-2.10R.

Maillard, Gabriel: *See—*
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,082, Cl. 424-317.000.
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,090, Cl. 424-317.000.

Majima, Kanji: *See—*
Okumura, Takeo; Hayashi, Shizuo; Majima, Kanji; and Takei, Kensuke, 4,077,911, Cl. 252-550.000.

Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Silla, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich. Apparatus for cross cutting coiled strip into rectangular and oblique angled plates and cutting off acute angles. 4,077,287, Cl. 83-92.000.

Malacheski, Joseph J.; and Zenda, Richard J., to Gutkowski, Donald, a part interest. Fluid transfer device. 4,077,544, Cl. 222-95.000.

Maldavs, Ojars, to Bruning Company, The. Quick coupling device. 4,077,433, Cl. 137-614.040.

Malik, Abdul-Ilah; and Most, Elmer Edwin, to Du Pont de Nemours, E. I., and Company. Process for depolymerizing waste ethylene terephthalate polyester. 4,078,143, Cl. 560-78.000.

Manaresi, Adriana. Container with bottom sealing disk which becomes a deformable member on discharge. 4,077,551, Cl. 222-494.000.

Mansfield, John W.: *See—*
Brown, Jerome D.; and Mansfield, John W., 4,077,430, Cl. 137-593.000.

Manshausen, Theodor: *See—*
Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, 4,077,841, Cl. 159-47.00R.

Marbot, Jakob, to S I G Scheizerische Industrie-Gesellschaft. Apparatus for closing lined boxes. 4,077,309, Cl. 93-27.000.

Marconi Company Limited, The: *See—*
McKee, Frederick Brian, 4,077,131, Cl. 33-356.000.

Marquez, Joseph A.: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; Marquez, Joseph A.; and Testa, Raymond T., 4,078,056, Cl. 424-117.000.

Marr, Peter: *See—*
Spies, Klaus; Blumental, Gunter; Bohnes, Karlheinz; and Marr, Peter, 4,077,670, Cl. 299-11.000.

Marritt, Clifford Russell: *See—*
Preston, Edward George; and Marritt, Clifford Russell, 4,077,415, Cl. 131-76.000.

Marseillan, Jorge. Means for molding a roof or floor slab. 4,077,598, Cl. 249-19.000.

Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., to Upjohn Company, The. Process for preparing steffimycinol. 4,077,844, Cl. 195-80.00R.

Martin, Eugene Ray, to SWS Silicones Corporation. Release composition for bituminous materials. 4,078,104, Cl. 427-387.000.

Martin, Jack; and Kulkarni, Avinash D., to Westinghouse Electric Corporation. Regenerative-cycle incandescent lamp containing a dual-additive. 4,078,188, Cl. 313-222.000.

Martin, Louis Emile; and Mauboussin, Antoine Theodore, to Societe Anonyme Poclain Hydraulics. Servo-operated regulator valve. 4,077,431, Cl. 137-596.140.

Masaki, Chiaki: *See—*
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, 4,078,253, Cl. 364-900.000.

Mashimo, Yukio: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.

Masi, Paolo: *See—*
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.

Massey-Ferguson Services N.V.: *See—*
Pensa, Carlo, 4,077,744, Cl. 417-218.000.

Massey, James Vincent, III: *See—*
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III, 4,077,396, Cl. 128-2.00F.

Massonne, Joachim: *See*—
Becher, Wilfried; and Massonne, Joachim, 4,078,043, Cl. 423-335.000.

Ma:ta, Robert I., to General Motors Corporation. Spark timing control system for an internal combustion engine. 4,077,372, Cl. 123-117.00D.

Masters, John L. Anchor light. 4,077,076, Cl. 9-8.30E.

Masuda, Senichi. Method and apparatus for passing an article through an interior of a pipe. 4,077,610, Cl. 254-134.400.

Mathern, Guy; Lefevre, Jean; Tricot, Roland; and Guessier, Andre, to Ugine Aciers. Process for producing dense machinable alloys from particulate scrap. 4,077,108, Cl. 29-403.000.

Mathews, Bertha B.: *See*—
Mathews, Frederic M., 4,077,271, Cl. 74-230.240.

Mathews, Frederic M., to Mathews, Walter M.; and Mathews, Bertha B., a part interest to each. Drive power transmission element. 4,077,271, Cl. 74-230.240.

Mathews, Walter M.: *See*—
Mathews, Frederic M., 4,077,271, Cl. 74-230.240.

Mathias, Richard A.; Adams, Lyle C.; and Miller, Edward N., to Macotech Corporation. Adaptive control system for numerically controlled machine tools. 4,078,195, Cl. 318-561.000.

Matsuda, Hisashi, to Hitachi, Ltd. Mass spectrometer. 4,078,176, Cl. 250-296.000.

Matsuda, Kenichi: *See*—
Suzuki, Suzuo; Isobe, Akio; and Matsuda, Kenichi, 4,077,209, Cl. 60-282.000.

Matsushita Electric Industrial Co., Ltd.: *See*—
Tanaka, Shigeru; and Ohnishi, Joichi, 4,077,936, Cl. 260-33.80R.

Mattel, Inc.: *See*—
Bass, Sidney; May, Herbert; and Rich, Hubert Allen, 4,077,339, Cl. 112-121.270.

Matthews, Hugh B., to Sperry Rand Corporation. Gravity head geothermal energy conversion system. 4,077,220, Cl. 60-641.000.

Matthews, Russell Byron, to Johnson Controls, Inc. Fuel ignition system having contact interlock protection. 4,077,762, Cl. 431-45.000.

Matthiesen, Horst: *See*—
Lang, Rainer; Matthiesen, Horst; and Rubruck, Manfred, 4,077,580, Cl. 242-58.200.

Mattos, David W. Locking, sanitary hub. 4,077,270, Cl. 74-230.400.

Mattson, John P. Solar energy heat collector. 4,077,393, Cl. 126-271.000.

Mauboussin, Antoine Theodore: *See*—
Martin, Louis Emile; and Mauboussin, Antoine Theodore, 4,077,431, Cl. 137-596.140.

Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, to Bayer Aktiengesellschaft. O-Alkyl-O-(1-carbalkoxy-2-tert.-pentyryl-vinyl)-(thiono) (thiol) phosphoric (phosphonic) acid esters, ester-amides and method of combatting insects. 4,078,057, Cl. 424-212.000.

Maxwell Laboratories, Inc.: *See*—
Drummond, James E.; Mondelli, Alfred A.; and Kolb, Alan C., 4,077,782, Cl. 55-139.000.

May, Herbert: *See*—
Bass, Sidney; May, Herbert; and Rich, Hubert Allen, 4,077,339, Cl. 112-121.270.

May, Richard, to Intercity Electric & Mechanical Services Ltd. Mobile boiler house. 4,077,568, Cl. 237-8.00D.

Mayenschein, Harley. Clock apparatus. 4,077,198, Cl. 58-1.00R.

Mayrandl, Helmut: *See*—
Smejkal, Hellmuth; Hiris, Otto; and Mayrandl, Helmut, 4,077,616, Cl. 266-281.000.

Mazzola, Louis R., to Lever Brothers Company. Encapsulated bleaches and methods for their preparation. 4,078,099, Cl. 427-213.000.

McAmish, Larry H.: *See*—
Peters, John P.; and McAmish, Larry H., 4,077,914, Cl. 252-518.000.

McCabe, Frank J., Jr.; Coleman, Milton H.; and Herb, Carl C., to Carrier Corporation. Air conditioning terminal assembly. 4,077,310, Cl. 98-40.00D.

McCaskey, Harold O., Jr.; and Palazzolo, Salvatore E., to Westinghouse Electric Corporation. Plastic ski surfacing system. 4,077,652, Cl. 280-610.000.

McCloskey, Albert R., to Heim Universal Inc. Self-adjusting bearing. 4,077,681, Cl. 308-72.000.

McCombie, Stuart W.: *See*—
Barton, Derek H. R.; and McCombie, Stuart W., 4,078,139, Cl. 536-17.000.

McCrae, James McGeachie; and Midcalf, Christopher, to Ciba-Geigy Corporation. Tri-dentate metal complex azo pigments. 4,077,953, Cl. 260-149.000.

McCurdy, Martin D. Integral pressure sensor probe for a cardiac assistance device. 4,077,394, Cl. 128-1.00D.

McDevitt, Robert F. Connectors for molten metal samplers. 4,077,264, Cl. 73-425.40R.

McDonnell, Damien Gerard: *See*—
Gray, George William; and McDonnell, Damien Gerard, 4,077,260, Cl. 73-356.000.

McElroy, Alan J.: *See*—
Phelps, James D. M.; McElroy, Alan J.; and Caleca, Vincent, 4,078,184, Cl. 307-147.000.

McGinnis, Lee R. Non-rotating ski-rope retriever. 4,077,583, Cl. 242-85.100.

McHardy, Nicholas, to Burroughs Wellcome Co. Method of treating Theileriosis. 4,078,088, Cl. 424-331.000.

McHenry, Carl R.: *See*—
Benjamin, J. Malvern, Jr.; Bolgiano, D. Ridgely; and McHenry, Carl R., 4,077,402, Cl. 128-24.00R.

McKee, Frederick Brian, to Marconi Company Limited, The. Magnetic compass arrangements. 4,077,131, Cl. 33-356.000.

McKeever, Carl W., to Lyall Electric, Inc. Method and apparatus for making lengths of flexible material. 4,077,118, Cl. 29-748.000.

McKibben, Richard K. Vibratory separator. 4,077,873, Cl. 209-332.000.

McKillip, William J.: *See*—
Langer, Heimo J.; and McKillip, William J., 4,078,115, Cl. 428-395.000.

McNeary, James J., to Wisconsin Alumni Research Foundation. Electronic graphics pad. 4,078,151, Cl. 178-18.000.

McNeill, William Allen, to Akzona Incorporated. Apparatus for developing bulk in a strand of synthetic textile yarn. 4,077,097, Cl. 28-281.000.

McPherson, Charles Allen, to Western Electric Company, Incorporated. Cured epoxy polymer having improved adhesive properties. 4,077,927, Cl. 260-23.70N.

Mead Corporation, The: *See*—
Oliff, James R., 4,077,095, Cl. 24-204.000.

Mead Johnson & Company: *See*—
Wu, Yao Hua; and Lobeck, Walter G., Jr., 4,077,959, Cl. 260-279.00R.

Meadors, William R., to Peerless Machine & Tool Corporation. Injection molding extrusion mixer. 4,077,756, Cl. 425-207.000.

Mechanical Plastics Corporation: *See*—
Thaw, Allan; and Milcetich, John, 4,077,169, Cl. 52-741.000.

Megahed, El Sayed; and Buelow, Carol, to ESB Incorporated. Additive for an alkaline battery employing divalent silver oxide positive active material. 4,078,127, Cl. 429-206.000.

Mehdorn, Frank: *See*—
Lorenz, Jurgen; and Mehdorn, Frank, 4,077,880, Cl. 210-65.000.

Meiers, Gerald Franklyn, to Deere & Company. Cylindrical baler conveyor. 4,077,315, Cl. 100-88.000.

Meiji Seika Kaisha, Ltd.: *See*—
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.

Melara, Francescantonio. Two wheel castor particularly for furniture. 4,077,088, Cl. 16-47.000.

Melchior, Jean; and Andre, Thierry, to Etat Francais. Supercharged internal combustion engines. 4,077,219, Cl. 60-599.000.

Melchior, John G.: *See*—
Schlottmann, Herman; and Melchior, John G., 4,077,506, Cl. 198-367.000.

Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, to Carlo Erba S.p.A. N-tricyclic derivatives of azetidine and pharmaceutical compositions and methods containing them. 4,078,072, Cl. 424-275.000.

Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, to Carlo Erba S.p.A. N-tricyclic derivatives of azetidine. 4,078,073, Cl. 424-278.000.

Mercer, Benjamin, Jr.; Riggs, Darius O.; and Vogel, Charles G., to Owens-Illinois, Inc. Impact simulation apparatus. 4,077,254, Cl. 73-94.000.

Merck & Co., Inc.: *See*—
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,067, Cl. 424-272.000.
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,068, Cl. 424-272.000.
Lumma, William C., Jr.; and Saari, Walfred S., 4,078,063, Cl. 424-250.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, 4,077,900, Cl. 252-299.000.

Metaverpa N.V.: *See*—
van Wegen, Wilhelmus F. S. M., 4,077,314, Cl. 100-26.000.

Metropolitan Furniture Manufacturing Co.: *See*—
Heumann, Jules M., 4,077,666, Cl. 297-440.000.

Meunier, Henry Gilbert; and Boelens, Jacques Toussaint, to Centre de Recherches Metallurgiques-Centrum voor Research de Metallurgie. Controlling an iron-ore agglomeration process. 4,078,262, Cl. 366-151.000.

Meyer, John. Tennis ball retrieving device. 4,077,533, Cl. 214-356.000.

Mezei, Tibor: *See*—
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.

Micalizzi, Edwin R.: *See*—
Fessler, Dyral C.; and Micalizzi, Edwin R., 4,077,998, Cl. 260-518.00R.

Michael, Richard Arlo, to Deere & Company. Transmission. 4,077,281, Cl. 74-760.000.

Michael, Richard Arlo: *See*—
Kress, James Henry; and Michael, Richard Arlo, 4,077,280, Cl. 74-760.000.

Micro Communicaiions Corporation: *See*—
Johnson, Eugene P., Jr., 4,078,194, Cl. 318-331.000.

Microdot Inc.: *See*—
Buffaloe, Malcolm E., 4,077,539, Cl. 221-237.000.

Midcalf, Christopher: *See*—
McCrae, James McGeachie; and Midcalf, Christopher, 4,077,953, Cl. 260-149.000.

Mikhaleva, Albina Ivanovna: *See*—
Trofimov, Boris Alexandrovich; Atavin, Alexandr Spiridonovich; Mikhaleva, Albina Ivanovna; Kalabin, Gennady Alexandrovich; and Chebatareva, Ekaterina Grigorievna, 4,077,975, Cl. 260-319.100.

Milberger, Ernest C.: *See*—
Dolhyj, Serge R.; and Milberger, Ernest C., 4,077,912, Cl. 252-461.000.

Milcetich, John: *See*—
Thaw, Allan; and Milcetich, John, 4,077,169, Cl. 52-741.000.

Miles Laboratories, Inc.: *See*—
Johnson, Leighton Clifford, 4,077,845, Cl. 195-103.50K.

Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, to Nipki po Tzvetna Metalurgia. Method of employing elemental zinc for the purification of aqueous solutions of metallic salts. 4,078,040, Cl. 423-102.000.

Miller, Edward N.: *See*—
Mathias, Richard A.; Adams, Lyle C.; and Miller, Edward N., 4,078,195, Cl. 318-561.000.

Miller, Robert M., to Denver Wood Products Co. Reel construction and assembly apparatus. 4,077,104, Cl. 29-271.000.

Miller, Ronald Lee, to International Prototypes, Inc. Metallic coating process. 4,078,097, Cl. 427-34.000.

Miller, Thomas J. Boat transport anchoring device. 4,077,553, Cl. 224-42.10G.

Miller, Vincent P. Cylinder striping device. 4,077,355, Cl. 118-219.000.

Millhollan, Michael S.; and Reinschmidt, Robert M., to Motorola, Inc. Sense/write circuits for bipolar random access memory. 4,078,261, Cl. 365-189.000.

Milliken Research Corporation: *See*—
Fusco, Anthony M., 4,077,992, Cl. 260-410.000.

Millonzi, Lawrence A.: *See*—
Morters, Ronald W.; and Millonzi, Lawrence A., 4,078,191, Cl. 318-227.000.
Nash, James N.; Morters, Ronald W.; and Millonzi, Lawrence A., 4,078,189, Cl. 318-227.000.

Mine, Yasuharu: *See*—
Ugata, Ken; Morita, Yasuji; Mine, Yasuharu; and Izaki, Hiroshi, 4,078,035, Cl. 264-221.000.

Minnesota Mining and Manufacturing Company: *See*—
Bunegar, Frederick J.; and Tesch, Sheila A., 4,077,896, Cl. 252-90.000.

Minolta Camera Kabushiki Kaisha: *See*—
Imaizumi, Koji; and Shimizu, Shigemitsu, 4,077,712, Cl. 355-10.000.

Minter, Marvin J.: *See*—
Glover, Douglas; and Minter, Marvin J., 4,077,872, Cl. 209-214.000.

Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, to Rikagaku Kenkyusho and Mitsubishi Petrochemical Company Limited. 2H-Chromene-2-spiro-3'-phthalides useful as horticultural and agricultural fungicides. 4,078,074, Cl. 424-279.000.

Misinchuk, Peter D., to Raymond Lee Organization, Inc., The. Vehicle auxiliary braking system. 4,077,487, Cl. 180-82.00R.

Mitamura, Ryota: *See*—
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Noda, Hiroshi; and Watanabe, Yukiyasu, 4,078,235, Cl. 343-9.000.

Mitsubishi Jukogyo Kabushiki Kaisha: *See*—
Nishino, Yasushi; Adachi, Saburo; and Karashima, Koji, 4,077,350, Cl. 114-260.000.

Mitsubishi Rayon Co., Ltd.: *See*—
Kato, Tetsuji, 4,077,755, Cl. 425-146.000.

Miyabayashi, Susumu: *See*—
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.

Miyagawa, Yoshitaka: *See*—
Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, 4,077,266, Cl. 73-517.00A.

Miyamoto, Koichi: *See*—
Komori, Shigehiro; Hattori, Hiroyuki; Inuzuka, Tsuneki; and Miyamoto, Koichi, 4,077,714, Cl. 355-51.000.

Miyazaki, Seiichi, to Ohkura Electric Co., Ltd. Loop data highway communication system. 4,078,228, Cl. 340-147.00R.

Miyazawa, Takeo: *See*—
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.

Miyoshi, Isao; Abe, Masaru; Tezuka, Toshiro; and Yoshimoto, Toshio, to Bridgestone Tire Company Limited. Pneumatic tires suitable for off-road vehicles. 4,077,454, Cl. 152-354.00R.

Mize, Lawrence A. Electronic roll warning system for vehicles. 4,078,224, Cl. 340-52.00H.

Mobil Oil Corporation: *See*—
Frangatos, Gerassimos, 4,077,892, Cl. 252-49.900.
Kaeding, Warren W., 4,078,009, Cl. 260-673.000.
Owen, Hartley; Venuto, Paul B.; and Yan, Tsoung-Yuan, 4,077,866, Cl. 208-9.000.
Wilson, Robert C., Jr.; and Schwartz, Albert B., 4,077,910, Cl. 252-455.00Z.

Mobilizer Medical Products, Inc.: *See*—
Koll, Laurel A.; and Depew, Noel, 4,077,073, Cl. 5-81.00R.

Mohasco Corporation: *See*—
Cycowicz, Izchak; Caldwell, Robert Joseph; and Ueng, Ming-Shean, 4,077,663, Cl. 297-83.000.

Mohon, Windell N., to United States of America, Navy. Apparatus for measuring holographic lens aberration parameters. 4,077,721, Cl. 356-124.000.

Molins Limited: *See*—
Preston, Edward George; and Marritt, Clifford Russell, 4,077,415, Cl. 131-76.000.

Moller, Hans; and Mussmann, Bernd, to Dragerwerk Aktiengesellschaft. Gas and gas-carried suspended matter indicator tube having fixing elements for reagent carriers. 4,077,776, Cl. 23-254.00R.

Momose, Tetsuo: *See*—
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, 4,077,615, Cl. 266-201.000.

Moncus, James D.: *See*—
Callegari, Stephen R.; Moncus, James D.; and Harper, Roland George, Jr., 4,077,525, Cl. 214-2.500.

Mondelli, Alfred A.: *See*—
Drummond, James E.; Mondelli, Alfred A.; and Kolb, Alan C., 4,077,782, Cl. 55-139.000.

Monier, Jean-Claude: *See*—
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,077,976, Cl. 260-326.200.

Monsanto Company: *See*—
Bowden, Woodrow Raleigh; Hills, William H.; and Winner, Frank Edward, 4,077,197, Cl. 57-156.000.
Morita, Eiichi, 4,077,924, Cl. 260-3.000.
Summers, Charles Gene, 4,078,001, Cl. 260-577.000.

Montedison S.p.A.: *See*—
Ribaldone, Giuseppe; and Grecu, Renato, 4,077,966, Cl. 260-302.00D.

Montefeltro R., Ludovico Lante. Target pigeon and launching apparatus therefor. 4,077,384, Cl. 124-1.000.

Montgomery, John A.: *See*—
Piper, James R.; and Montgomery, John A., 4,077,957, Cl. 260-251.500.

Moog, Gerhard W.; and Cooper, Kenneth R., to Canada Square Management Ltd. Cooling system for buildings. 4,077,464, Cl. 165-18.000.

Mooney, Paul C., to Quick-Set, Incorporated. Caster and brake assembly. 4,077,087, Cl. 16-35.00R.

Moore, Charles Gregg: *See*—
Roe, Elverton O.; and Moore, Charles Gregg, 4,077,082, Cl. 15-230.110.

Moossun, Mohamed H. Stomach intubation and catheter placement system. 4,077,412, Cl. 128-347.000.

Moreau, Jean-Louis Yves Charles, to International Standard Electric Corporation. Clock signal and auxiliary signal transmission system. 4,078,153, Cl. 178-69.100.

Morey, Booker W.: *See*—
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., 4,077,847, Cl. 201-21.000.
Kumar, Tribhawan; and Morey, Booker W., 4,077,871, Cl. 209-4.000.

Morgan, George W.: *See*—
Lichtenberger, Gunter J.; and Morgan, George W., 4,077,225, Cl. 61-103.000.

Mori, Masahiro: *See*—
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, 4,078,253, Cl. 364-900.000.

Morin, Robert B.: *See*—
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,067, Cl. 424-272.000.
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,068, Cl. 424-272.000.

Morita, Eiichi, to Monsanto Company. Polyester fiber-rubber composites vulcanized with phosphinothioyl amino sulfides. 4,077,924, Cl. 260-3.000.

Morita, Yasuji: *See*—
Ugata, Ken; Morita, Yasuji; Mine, Yasuharu; and Izaki, Hiroshi, 4,078,035, Cl. 264-221.000.

Moritz, Karsten H.; and Weissman, Walter, to Exxon Research & Engineering Co. Integrated coking and gasification process. 4,077,869, Cl. 208-127.000.

Morris, John M., to Rexnord Inc. Electrofluidized bed gas purification arrangement and method. 4,078,041, Cl. 423-210.000.

Morris, Robert B., to Westinghouse Air Brake Company. Disc for disc brake unit. 4,077,501, Cl. 188-218.0XL.

Morrison, John Malcolm: *See*—
Ritchie, Grant Edgar; and Morrison, John Malcolm, 4,078,200, Cl. 323-9.000.

Morse, Mansfield K. Integral hole saw and arbor construction. 4,077,737, Cl. 408-206.000.

Morters, Ronald W.; and Millonzi, Lawrence A., to Harnischfeger Corporation. Control system for regulating the torque and speed of an electric motor. 4,078,191, Cl. 318-227.000.

Morters, Ronald W.: *See*—
Nash, James N.; Morters, Ronald W.; and Millonzi, Lawrence A., 4,078,189, Cl. 318-227.000.

Morton-Norwich Products, Inc.: *See*—
Fessler, Dyral C.; and Micalizzi, Edwin R., 4,077,998, Cl. 260-518.00R.
Pelosi, Jr.; Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,078,141, Cl. 544-152.000.

Moser, Paul; and Rody, Jean, to Ciba-Geigy Corporation. Nickel stabilizers for synthetic polymers. 4,077,902, Cl. 252-400.00A.
Mosijowsky, Michael B. Tree and shrub feeder. 4,077,511, Cl. 206-.500.
Mosser Industries, Inc.: *See*—
Herr, Leroy E., 4,077,432, Cl. 137-601.000.
Most, Elmer Edwin: *See*—
Malik, Abdul-Ilah; and Most, Elmer Edwin, 4,078,143, Cl. 560-78.000.
Motorenfabrik Hatz GmbH & Co. KG: *See*—
Hatz, Ernst, 4,077,383, Cl. 123-198.00E.
Motorola, Inc.: *See*—
Bost, Jonathan Robert, 4,078,160, Cl. 179-110.00A.
Millhollan, Michael S.; and Reinschmidt, Robert M., 4,078,261, Cl. 365-189.000.
Moyer, Joseph Donald; and Kramm, David Edward, to W. R. Grace & Co. Pentaerythritol esters of mercapto acids plus long chain fatty acids. 4,078,118, Cl. 428-521.000.
Mueller, Larry G.: *See*—
Wagner, Eugene R.; and Mueller, Larry G., 4,078,084, Cl. 424-324.000.
Muhlberger, Uwe: *See*—
Nitsche, Martin; Weinrich, Hellmut; and Muhlberger, Uwe, 4,077,502, Cl. 192-4.00B.
Mullen, Delmar Eugene. Tone control and tuning apparatus for a stringed instrument. 4,077,296, Cl. 84-312.00P.
Muller, Arthur E., to Zbinden & Co. Clamping device for articles to be electroplated. 4,077,865, Cl. 204-297.00W.
Muller, Gerd: *See*—
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, 4,077,972, Cl. 260-314.500.
Muller, Hermann. Toy building block set. 4,077,154, Cl. 46-26.000.
Muller, Hugo Stefan. Guide mechanism for conveyor system. 4,077,510, Cl. 198-840.000.
Munk, Edmund E.; and Haas, Herbert G., to Werzalik-Pressholzwerk J.F. Werz Jr. KG. Molding of articles from fibrous material. 4,078,030, Cl. 264-109.000.
Murakami, Tadao, to Hitachi, Ltd. Roller type chassis dynamometer. 4,077,255, Cl. 73-117.000.
Murakosi, Takeo; and Tanno, Toshiyuki, to Hitachi, Ltd. Apparatus for repeating the same process. 4,078,198, Cl. 318-627.000.
Murata Manufacturing Co., Ltd.: *See*—
Hamuro, Mituro; Taki, Tsuneo; and Tsuino, Yasuhiro, 4,077,439, Cl. 140-1.000.
Murata, Seiichiro: *See*—
Inoue, Takehiko; Tabata, Junichi; Ohishi, Hidekatsu; and Murata, Seiichiro, 4,077,346, Cl. 114-74.00A.
Murray, Jerome L.; and Gardiner, Frances R. Catamenial device employing polymeric constraining means. 4,077,408, Cl. 128-285.000.
Murray, Jerome L.; and Gardiner, Frances R. Encapsulated catamenial device. 4,077,409, Cl. 128-285.000.
Murray, Robert G., to Stanford Research Institute. Particulate material feeding method and apparatus. 4,077,541, Cl. 222-1.000.
Mussmann, Bernd: *See*—
Moller, Hans; and Mussmann, Bernd, 4,077,776, Cl. 23-254.00R.
Mutz, Michael Joseph: *See*—
Starkweather, Howard Warner, Jr.; and Mutz, Michael Joseph, 4,078,014, Cl. 260-857.00L.
Muzyczko, Thaddeus M.; and Fieder, Donald W., to Richardson Company, The. Light sensitive composition and products thereof. 4,077,806, Cl. 96-115.00R.
Myrens Verksted A/S: *See*—
Loken, Per A., 4,077,133, Cl. 34-17.000.
Nadkarni, Anil V., to SCM Corporation. Dispersion-strengthened metals. 4,077,816, Cl. 148-126.000.
Nadkarni, Ravindra M., to Combustion Equipment Associates, Inc. Process and apparatus for removing sulfur from stack gases in the form of elemental sulfur. 4,078,048, Cl. 423-571.000.
Naganuma, Yoshinori; and Arai, Haruhiko, to Kao Soap Co., Ltd. Deodorizing and smell-removing composition and method of using same. 4,078,055, Cl. 424-76.000.
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, to Kubota, Ltd. Suction heads for the removal of scum. 4,077,615, Cl. 266-201.000.
Nagasawa, Toshio: *See*—
Yamaguchi, Koji; Takashima, Hideaki; Tsurutani, Iwao; and Nagasawa, Toshio, 4,078,111, Cl. 427-120.000.
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, to Idemitsu Kosan Company, Ltd. Process for production of modified polypropylene. 4,078,017, Cl. 260-878.00R.
Nagayama Electronic Industry Co., Ltd.: *See*—
Nagayama, Yutaka, 4,077,647, Cl. 280-211.000.
Nagayama, Keiji: *See*—
Suzuki, Seiichi; Yamaguchi, Masahiro; Takahashi, Saburo; and Nagayama, Keiji, 4,077,258, Cl. 73-302.000.
Nagayama, Yutaka, to Nagayama Electronic Industry Co., Ltd. Ridable amusement device. 4,077,647, Cl. 280-211.000.
Nahas, Nicholas C.; and Vadovic, Charles J., to Exxon Research & Engineering Co. Process for the catalytic gasification of coal. 4,077,778, Cl. 48-202.000.
Naka, Hiromitsu. Method of producing a flexible non-skid strip. 4,077,825, Cl. 156-244.180.
Nakada, Akira: *See*—
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,077,294, Cl. 84-1.230.
Nakamura, Zenzo: *See*—
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.
Nakane, Kazunori: *See*—
Akado, Hajime; Kamo, Hideo; and Nakane, Kazunori, 4,077,787, Cl. 55-419.000.
Nakano, Soichi; Ishii, Yohji; Sekiya, Tetsuo; and Fujimura, Akira, to Honda Giken Kogyo Kabushiki Kaisha. Ignition timing control device for an internal combustion engine. 4,077,373, Cl. 123-117.00A.
Nakao, Michito: *See*—
Fukusen, Hiroshi; Yamanaka, Hironori; Oishi, Sachio; and Nakao, Michito, 4,077,530, Cl. 214-152.000.
Nakase, Takamichi: *See*—
Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, 4,077,207, Cl. 60-276.000.
Nakayama, Makoto: *See*—
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, to Ihara Chemical Industry Co., Ltd. Process for producing carbonyl sulfide. 4,078,045, Cl. 423-416.000.
Nalco Chemical Company: *See*—
Gebler, Kenneth A., 4,077,600, Cl. 249-204.000.
Napierala, Gunter: *See*—
Kleinschmidt, Hans-Joachim; and Napierala, Gunter, 4,077,235, Cl. 64-17.00A.
Nasgowitz, Donald D., to Display Corporation International. Simulated neon display device. 4,077,146, Cl. 40-564.000.
Nash, James N.; Morters, Ronald W.; and Millonzi, Lawrence A., to Harnischfeger Corporation. Control system for regulating the torque and speed of an electric motor including static frequency detector for speed detection and regulation. 4,078,189, Cl. 318-227.000.
Nash, James N., to Harnischfeger Corporation. Control system for regulating the speed of an electric motor including static frequency detector for speed detection and regulation. 4,078,190, Cl. 318-227.000.
Nasser, Gamal El Din, to Linde Aktiengesellschaft. Pressure electrolyzer. 4,077,863, Cl. 204-268.000.
National Can Corporation: *See*—
Sauer, Donald G., 4,077,760, Cl. 425-562.000.
National Distillers and Chemical Corporation: *See*—
Hoyt, John M.; Koch, Karl; and Fischer, Joseph, 4,078,128, Cl. 526-10.000.
Smith, Joseph W., 4,077,456, Cl. 152-427.000.
National Forge Company: *See*—
Duliba, Paul, 4,077,285, Cl. 82-1.00C.
National Gypsum Company: *See*—
Smith, Richard E., 4,077,168, Cl. 52-622.000.
National Instrument Company: *See*—
Rosen, Sidney; and Bennett, Richard Nelson, 4,077,441, Cl. 141-1.000.
National Research Development Corporation: *See*—
Briggs, Ronald, 4,077,724, Cl. 356-208.000.
Brooks, Gerald Thomas, 4,078,077, Cl. 424-285.000.
Klinner, Wilfred Erwin; and Harris, Alan Winston, 4,077,192, Cl. 56-16.400.
Lewis, Meirion Francis, 4,078,210, Cl. 331-107.00A.
Naumann, Fritz Albert, to Audi NSU Auto Union AG. Fuel tank assembly. 4,077,884, Cl. 210-172.000.
NCR Corporation: *See*—
Lewis, Kim R.; and Corbett, William H., 4,077,581, Cl. 242-67.30R.
Nedelec, Lucien; Torelli, Vesperto; and Fournex, Robert, to Roussel UCLAF. Novel 2,2-dimethyl steroids. 4,078,059, Cl. 424-242.000.
Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek: *See*—
van Heuven, Jan Willem; and Bloebaum, Roelof Karl, 4,077,885, Cl. 210-193.000.
Neef, Gunter: *See*—
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,077,996, Cl. 260-464.000.
Nehrig, R. Harlan, to Auto Specialties Manufacturing Company. Hydraulic hand jack. 4,077,608, Cl. 254-93.00H.
Neill, Keith Gordon: *See*—
Bolza, Frederick; Jellinek, Thomas; Neill, Keith Gordon; and Tankey, Howard William, 4,077,820, Cl. 149-109.400.
Nelson, Charles J.: *See*—
Nelson, Evan S.; and Nelson, Charles J., 4,077,178, Cl. 53-15.000.
Nelson Company, The: *See*—
Nelson, Evan S.; and Nelson, Charles J., 4,077,178, Cl. 53-15.000.
Nelson, Evan S.; and Nelson, Charles J., to Nelson Company, The. Easily perforatable container to facilitate dispensing of contents. 4,077,178, Cl. 53-15.000.
Nemeth, Harold Charles: *See*—
Shapiro, Sydney Harold; Johnson, Dale Howard; and Nemeth, Harold Charles, 4,078,105, Cl. 427-417.000.
Nenov, Borimir Nanov: *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Neste Oy: *See—*
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,078,140, Cl. 536-84.000.
Neti, Radhakrishna Murty; and Graham, Laurence Drell, to Beckman Instruments, Inc. Interferent-free fluorescence detection of sulfur dioxide. 4,077,774, Cl. 23-232.00R.
Netz, Otto: *See—*
Corte, Herbert; Heller, Harold; and Netz, Otto, 4,077,918, Cl. 260-2.10E.
Neukom, Chester G., to Haybuster Manufacturing, Inc. Down pressure control mechanism for grain drills. 4,077,478, Cl. 172-267.000.
New Research and Development Laboratories, Inc.: *See—*
Le Roy, Pierre L., 4,077,399, Cl. 128-23.000.
Newman, Joe Westley. Exercising machine. 4,077,626, Cl. 272-128.000.
Newsom, Clara: *See—*
Newsom, Donald; and Newsom, Clara, 4,077,152, Cl. 46-12.000.
Newsom, Donald; and Newsom, Clara, to Raymond Lee Organization, Inc., The. Prairie doll house. 4,077,152, Cl. 46-12.000.
Ng, Steve Y. W.: *See—*
Dale, James A.; and Ng, Steve Y. W., 4,078,091, Cl. 426-545.000.
Nibby, Chester M., Jr.; and Barlow, George J., to Honeywell Information Systems Inc. Error detection and correction locator circuits. 4,077,565, Cl. 235-312.000.
Nicholson Manufacturing Company: *See—*
Ackerman, Robert T., 4,077,450, Cl. 144-172.000.
Nickel, Horst: *See—*
Bleck, Wolf-Eckhard; Nickel, Horst; and Kramer, Erich, 4,077,767, Cl. 8-85.00R.
Nicola, Hubertus Bartholomeus: *See—*
Colbers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, 4,077,973, Cl. 260-314.500.
Nielsen, Donald W.: *See—*
Agent, J. Richard; Nielsen, Donald W.; and Cooper, Thomas A., 4,077,180, Cl. 53-37.000.
Nifco Inc.: *See—*
Yoda, Tohru, 4,077,300, Cl. 85-80.000.
Yuda, Takuo, 4,077,085, Cl. 16-2.000.
Nilcon Engineering AB: *See—*
Lidstrom, Thony Gote, 4,077,440, Cl. 140-105.000.
Ninov, Emil Pantaleev: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.
Nipki po Tzvetna Metalurgia: *See—*
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.
Nippon Air Brake Co., Ltd., The: *See—*
Doto, Shigeaki, 4,077,674, Cl. 303-40.000.
Hata, Yasuhisa, 4,077,676, Cl. 303-22.00A.
Nippon Gakki Seizo Kabushiki Kaisha: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,077,294, Cl. 84-1.230.
Nippon Kogaku K.K.: *See—*
Kasai, Toshiyuki, 4,077,720, Cl. 356-118.000.
Nippon Soken, Inc.: *See—*
Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, 4,077,207, Cl. 60-276.000.
Kasagi, Takao; Kuwakado, Satosi; and Takei, Toshihiro, 4,077,423, Cl. 137-68.00A.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,077,363, Cl. 123-32.0SP.
Nippon Steel Corporation: *See—*
Ayusawa, Saburo; and Tanaka, Mansei, 4,077,098, Cl. 29-33.00T.
Nippondenso Co., Ltd.: *See—*
Akado, Hajime; Kamo, Hideo; and Nakane, Kazunori, 4,077,787, Cl. 55-419.000.
Okumura, Nozomu, 4,077,378, Cl. 123-148.00P.
Nishi, Satoru; and Tanaka, Katsumasa, to Kobe Steel, Ltd. Apparatus for detecting wire joint. 4,078,202, Cl. 324-61.00R.
Nishikata, Goro, to Kabushiki Kaisha Mitutoyo Seisakusho. Portable, lightweight measuring instrument. 4,077,129, Cl. 33-147.00T.
Nishino, Yasushi; Adachi, Saburo; and Karashima, Koji, to Mitsubishi Jukogyo Kabushiki Kaisha. Barge-carrying ship. 4,077,350, Cl. 114-260.000.
Nishiyama, Kazuhiro. Apple juice compositions and milk-apple juice drink containing such compositions. 4,078,092, Cl. 426-584.000.
Nissan Chemical Industries, Ltd.: *See—*
Yoshida, Akitoshi; Kosaka, Masaharu; and Kitajima, Akira, 4,078,029, Cl. 264-63.000.
Nissan Motor Company, Limited: *See—*
Hayashi, Yoshimasa; and Sensui, Kunio, 4,077,458, Cl. 164-11.000.
Ishikawa, Katuichi; Sakakibara, Yuji; Sawada, Hiraki; and Otsubo, Kizuku, 4,077,375, Cl. 123-122.0AB.
Itoh, Takane, 4,077,204, Cl. 60-39.28R.
Maeda, Riichi, 4,077,221, Cl. 60-650.000.
Ohki, Yoshitaka; Iida, Hiroshi; Kumagai, Kenji; and Ishi, Taro, 4,077,210, Cl. 60-282.000.
Sawada, Hiraki, 4,077,208, Cl. 60-277.000.
Suzuki, Suzuo; Isobe, Akio; and Matsuda, Kenichi, 4,077,209, Cl. 60-282.000.
Tanaka, Shigenori; Tojo, Akio; Shindo, Akio; and Ohnishi, Kimimasa, 4,077,438, Cl. 139-302.000.
Nissen, Rudolf F.: *See—*
Owen, Marshall L.; and Nissen, Rudolf F., 4,077,468, Cl. 165-159.000.
Nisshin Oil Mills, Ltd., The: *See—*
Ukai, Akitoshi; and Usui, Yutaka, 4,078,147, Cl. 560-180.000.
Nitsche, Martin; Weinrich, Hellmut; and Muhlberger, Uwe, to Voith Getriebe KG. Hydrodynamic-mechanical drive and brake for vehicles. 4,077,502, Cl. 192-4.00B.
Nittan Company, Limited: *See—*
Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, 4,077,923, Cl. 260-2.300.
Noda, Hiroshi; and Watanabe, Yukiyasu, to Mitsubishi Denki Kabushiki Kaisha. Obstacle detecting system. 4,078,235, Cl. 343-9.000.
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, to Nippon Soken, Inc. Internal combustion engine. 4,077,363, Cl. 123-32.0SP.
Northern Telecom Limited: *See—*
Botros, Radamis; and Lafrance, Conrad Damien, 4,078,155, Cl. 179-1.0CN.
Norwood, Robert A.: *See—*
Fletcher, Wade D.; and Norwood, Robert A., 4,077,344, Cl. 113-115.000.
Noshay, Allen; and Karol, Frederick John, to Union Carbide Corporation. Olefin polymerization process and catalyst therefor. 4,077,904, Cl. 252-429.00R.
Nosova, Larisa Alexeevna: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.
NTN Toyo Bearing Co. Ltd.: *See—*
Tani, Hajime, 4,077,812, Cl. 148-12.400.
Nurmukhomedov, Siyar Nurgalievich: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.
O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Schwappach, Dieter, 4,077,729, Cl. 403-379.000.
Obenshain, David Noel, to Westvaco Corporation. Web slitting apparatus. 4,077,291, Cl. 83-499.000.
Occidental Petroleum Corporation: *See—*
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., 4,077,847, Cl. 201-21.000.
Kumar, Tribhawan; and Morey, Booker W., 4,077,871, Cl. 209-4.000.
Oce-van der Grinten, N.V.: *See—*
Vercoulen, Johannes C. A., 4,077,713, Cl. 355-16.000.
Oddo, Ralph: *See—*
Lieberman, Lester; and Oddo, Ralph, 4,077,503, Cl. 192-18.00R.
Oelke, Waldemar W., to Libbey-Owens-Ford Company. Electrical contact apparatus on a glass sheet gravity mold. 4,077,791, Cl. 65-273.000.
O'Farrell, Charles P.: *See—*
Burton, Gilbert W.; and O'Farrell, Charles P., 4,077,933, Cl. 260-29.7EM.
Ogura, Hisashi: *See—*
Kaneko, Yoshikazu; and Ogura, Hisashi, 4,078,240, Cl. 354-33.000.
Ogura, Masaru: *See—*
Farnsworth, Norman R.; Cordell, Geoffrey A.; and Ogura, Masaru, 4,078,145, Cl. 560-126.000.
Ohashi, Takashi: *See—*
Yukuta, Toshio; Ohashi, Takashi; and Arai, Katsuhiko, 4,077,920, Cl. 260-2.5AM.
Ohishi, Hidekatsu: *See—*
Inoue, Takehiko; Tabata, Junichi; Ohishi, Hidekatsu; and Murata, Seiichiro, 4,077,346, Cl. 114-74.00A.
Ohki, Yoshitaka; Iida, Hiroshi; Kumagai, Kenji; and Ishi, Taro, to Nissan Motor Company, Limited. Exhaust manifold. 4,077,210, Cl. 60-282.000.
Ohkura Electric Co., Ltd.: *See—*
Miyazaki, Seiichi, 4,078,228, Cl. 340-147.00R.
Ohnishi, Joichi: *See—*
Tanaka, Shigeru; and Ohnishi, Joichi, 4,077,936, Cl. 260-33.80R.
Ohnishi, Kimimasa: *See—*
Tanaka, Shigenori; Tojo, Akio; Shindo, Akio; and Ohnishi, Kimimasa, 4,077,438, Cl. 139-302.000.
Ohtaki, Shyohei: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, to Hitachi, Ltd.; and Showa Denko K.K. Aluminum alloys having improved mechanical properties and workability and method of making same. 4,077,810, Cl. 148-2.000.

Oishi, Sachio: *See—*
Fukusen, Hiroshi; Yamanaka, Hironori; Oishi, Sachio; and Nakao, Michito, 4,077,530, Cl. 214-152.000.
Okamura, Sataro: *See—*
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, 4,078,045, Cl. 423-416.000.
Okazaki Manufacturing Company Limited: *See—*
Okazaki, Tatsuo, 4,077,862, Cl. 204-262.000.
Okazaki, Tatsuo, to Okazaki Manufacturing Company Limited. Device for regulating drinking water. 4,077,862, Cl. 204-262.000.
Oki Electric Industry Co., Ltd.: *See—*
Kanisawa, Hajime; and Tanagawa, Korzi, 4,078,187, Cl. 310-319.000.
Okumura, Nozomu, to Nippondenso Co., Ltd. Distributor with noise suppressing device. 4,077,378, Cl. 123-148.00P.
Okumura, Takeo; Hayashi, Shizuo; Majima, Kanji; and Takei, Kensuke, to Kao Soap Co., Ltd. Liquid detergent of reduced color fading. 4,077,911, Cl. 252-550.000.
Okuyama, Shigeaki: *See—*
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, 4,077,475, Cl. 172-3.000.
Oland, John H. Device for forming apertures in concrete. 4,077,599, Cl. 249-177.000.
Oliff, James R., to Mead Corporation, The. Panel interlocking means. 4,077,095, Cl. 24-204.000.
Olin Corporation: *See—*
Gavin, David F.; Fidler, Delmer A.; and Tobin, John H., 4,078,000, Cl. 260-577.000.
Knollmueller, Karl O., 4,077,993, Cl. 260-448.80R.
Smeck, Carroll I., 4,077,879, Cl. 210-62.000.
Olofsson, Sigfrid M., to AB Malte Sandgren. Arrangement in liquid sprayer containers. 4,077,442, Cl. 141-20.000.
Olschewski, Armin: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.
Olszanski, Henry H.: *See—*
Lender, Adam; and Olszanski, Henry H., 4,078,157, Cl. 179-16.0EA.
Lender, Adam; and Olszanski, Henry H., 4,078,159, Cl. 178-68.000.
Olympus Optical Co., Ltd.: *See—*
Koizumi, Toshimichi; and Unami, Miwako, 4,077,704, Cl. 350-218.000.
Omori, Takashi; and Sugiyama, Sakae, to Hitachi, Ltd. Apparatus for automatically starting up nuclear reactor. 4,077,836, Cl. 176-22.000.
Opperman, Ruth: *See—*
Freiberg, Gunter; Koopmann, Adolf; Luder, Gunther; Opperman, Ruth; and Hofmann, Wilfried, 4,077,708, Cl. 353-27.00R.
Orensten, Henry E.; and Orensten, Vivian C. Water filtration method. 4,077,877, Cl. 210-17.000.
Orensten, Vivian C.: *See—*
Orensten, Henry E.; and Orensten, Vivian C., 4,077,877, Cl. 210-17.000.
Orimo, Katsumi: *See—*
Shimano, Takashi; Orimo, Katsumi; and Yamamoto, Shoji, 4,077,603, Cl. 251-205.000.
Oriol, Andre C., to Saxby. Assembly for the automatic operation of hand carts, especially hospital carts. 4,077,535, Cl. 214-515.000.
Osborn, Merritt A. Supported pin-type gear structure. 4,077,273, Cl. 74-415.000.
Ota, Yoshimi: *See—*
Hino, Masamichi; Okuyama, Shigeaki; Ito, Katsumi; Ota, Yoshimi; and Kinoshita, Mikio, 4,077,475, Cl. 172-3.000.
Otis Engineering Corporation: *See—*
Gano, John C., 4,077,472, Cl. 166-315.000.
Otsubo, Kizuku: *See—*
Ishikawa, Katuichi; Sakakibara, Yuji; Sawada, Hiraki; and Otsubo, Kizuku, 4,077,375, Cl. 123-122.0AB.
Outokumpu Oy: *See—*
Fallenius, Kai, 4,078,026, Cl. 261-87.000.
Overlach, Knud: *See—*
Braun, Oskar; Dobner, Reinhold; Overlach, Knud; and Pietzsch, Ludwig, 4,077,340, Cl. 112-131.000.
Owen, Hartley; Venuto, Paul B.; and Yan, Tsoung-Yuan, to Mobil Oil Corporation. Process for producing low-sulfur liquid and solid fuels from coal. 4,077,866, Cl. 208-9.000.
Owen, Marshall L.; and Nissen, Rudolf F., to Owen Power Industries, Inc. Fluid heater. 4,077,468, Cl. 165-159.000.
Owen Power Industries, Inc.: *See—*
Owen, Marshall L.; and Nissen, Rudolf F., 4,077,468, Cl. 165-159.000.
Owens-Corning Fiberglas Corporation: *See—*
Benson, Gustav E.; and Taylor, Everett W., 4,077,084, Cl. 15-306.00A.
Goodridge, Paul A., 4,077,790, Cl. 65-11.00R.
Owens-Illinois, Inc.: *See—*
Mercer, Benjamin, Jr.; Riggs, Darius O.; and Vogel, Charles G., 4,077,254, Cl. 73-94.000.
Ozima, Kazutaka. Process for producing water-soluble vinyl high-polymers by reversed-phase emulsion polymerization. 4,078,133, Cl. 526-80.000.
Pablo, Cecilia P. M. Optical apparatus for viewing objects at an angle to the direct line of vision. 4,077,703, Cl. 350-145.000.
Pacansky, Thomas J.; and Becker, James H., to Xerox Corporation. Method of fountainless lithography. 4,077,324, Cl. 101-450.000.
Pacansky, Thomas J.; and Amidon, Alan B., to Xerox Corporation. Process for preparing waterless printing masters. 4,077,325, Cl. 101-467.000.
Paglia, Richard, to Polaroid Corporation. Film-engaging photographic mechanism for self-developing film. 4,078,241, Cl. 354-86.000.
Paladino, C. Alfred, to International Telephone and Telegraph Corporation. Sound communication system with speaker protection for frequencies below a predetermined minimum. 4,078,209, Cl. 331-47.000.
Palamidessi, Giorgio: *See—*
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.
Palazzolo, Salvatore E.: *See—*
McCaskey, Harold O., Jr.; and Palazzolo, Salvatore E., 4,077,652, Cl. 280-610.000.
Palomino, Julio: *See—*
Carratala, Alfredo; and Palomino, Julio, 4,077,593, Cl. 248-146.000.
Paly, Polikarp Avtonomovich: *See—*
Ioannesian, Rolen Arsenievich; Ioanesian, Jury Rolenovich; Paly, Polikarp Avtonomovich; Konstantinov, Leonid Pavlovich; and Vladislavlev, Jury Evgenievich, 4,077,482, Cl. 175-340.000.
Pan, Peter N. Y.: *See—*
Kulikowski, Donald F.; Richie, Kenneth E.; and Pan, Peter N. Y., 4,077,543, Cl. 222-95.000.
Pane, Francis C.; and Sepulveda, Domingo, to United Technologies Corporation. Louver construction for liner of gas turbine engine combustor. 4,077,205, Cl. 60-39.320.
Pangilinan, Ernesto M.: *See—*
Hasenwinkle, Earl D.; Pangilinan, Ernesto M.; and Wislocker, Frank, 4,077,448, Cl. 144-118.000.
Panzer, George W., to Alcolac, Inc. Aqueous soluble mixed complex organic salts of aluminum sulfate. 4,077,917, Cl. 252-545.000.
Paolinelli, Antonio: *See—*
Piccolo, Luigi; and Paolinelli, Antonio, 4,077,794, Cl. 71-31.000.
Papahadjopoulos, P. Demetrios, to United States of America, Health, Education and Welfare. Large unilamellar vesicles (LUV) and method of preparing same. 4,078,052, Cl. 424-36.000.
Papaluca, Vincent, to ACI Operations Pty, Ltd. Liquid fill apparatus. 4,077,182, Cl. 53-109.000.
Paparatto, Piero; Vargiu, Silvio; Parodi, Antonio; and Passalenti, Beppino, to Societa' Italiana Resine S.I.R. S.p.A. Moulding compositions including an unsaturated polyester. 4,077,939, Cl. 260-40.00R.
Papenfuhs, Theodor: *See—*
Gunther, Dieter; and Papenfuhs, Theodor, 4,077,961, Cl. 260-281.00P.
Papuchon, Michel, to Thomson-CSF. Method of manufacturing an electro-optical switch. 4,077,113, Cl. 29-600.000.
Parashkevov, Hristo Nenchev: *See—*
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.
Park, Yong S.: *See—*
Prazak, Charles J.; and Park, Yong S., 4,078,239, Cl. 354-1.000.
Parker, Donald L.: *See—*
United States of America, National Aeronautics and Space Administration; Parker, Donald L.; and Porter, Wilbur A., 4,078,175, Cl. 250-277.0CH.
Parker-Hannifin Corporation: *See—*
Spaude, Robin W.; and Bowers, Alvin L., 4,077,493, Cl. 184-105.00A.
Spaude, Robin W.; and Bowers, Alvin L., 4,077,494, Cl. 184-105.00A.
Swindler, Henry A., 4,077,656, Cl. 285-110.000.
Parodi, Antonio: *See—*
Paparatto, Piero; Vargiu, Silvio; Parodi, Antonio; and Passalenti, Beppino, 4,077,939, Cl. 260-40.00R.
Parrella, Alfred Theodore: *See—*
Bennett, Robert Gordon, Jr.; and Parrella, Alfred Theodore, 4,077,163, Cl. 51-165.770.
Parstorfer, Richard: *See—*
Kunze, Dieter; Wolf, Horst-Wolfgang; and Parstorfer, Richard, 4,077,702, Cl. 350-96.210.
Partridge, Leslie W., to Burdick Corporation, The. Defibrillator. 4,077,413, Cl. 128-419.00D.
Passalenti, Beppino: *See—*
Paparatto, Piero; Vargiu, Silvio; Parodi, Antonio; and Passalenti, Beppino, 4,077,939, Cl. 260-40.00R.
Passerini, Norina: *See—*
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.
Patelli, Bianca: *See—*
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and Di Marco, Aurelia, 4,077,988, Cl. 260-376.000.
Patterson, John F.; and Flora, Barney S., to Exxon Nuclear Company, Inc. Nuclear reactor spring strip grid spacer. 4,077,843, Cl. 176-76.000.
Paul, William A. Line boy. 4,077,349, Cl. 114-230.000.
Paulson, William T.; Davidson, David M., deceased (by Davidson, Clara A., executrix); Gilbert, L. Eldean; Gabbard, Henry; and Bemus,

Richard D., to Standard Register Company, The. Method for producing a business form article. 4,077,824, Cl. 156-244.240.

Pawelski, Ludwig: *See—*
Koppers, Manfred; and Pawelski, Ludwig, 4,077,223, Cl. 61-45.00D.

Paxton, Jerre H. Cold co-cycling bag closure imprinting and bag closing machine. 4,077,187, Cl. 53-131.000.

Pazurek, Werner: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.

Pedersen, John A., to Wheelabrator-Frye Inc. Sealed hanger bearing for use with abrasive conveyors. 4,077,508, Cl. 198-666.000.

Peehs, Martin; and Hunner, Manfred, to Kraftwerk Union Aktiengesellschaft. Fuel assembly for gas-cooled nuclear reactors. 4,077,839, Cl. 176-78.000.

Peek, Hermanus Leonardus: *See—*
Theunissen, Matthias Johannes Joseph; Kramer, Roelof Pieter; and Peek, Hermanus Leonardus, 4,077,112, Cl. 29-580.000.

Peerless Machine & Tool Corporation: *See—*
Meadors, William R., 4,077,756, Cl. 425-207.000.

Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, to DSO "Cherna Metalurgia". Apparatus for the application of a protective coating to a graphite electrode. 4,077,357, Cl. 118-321.000.

Peisner, Israel D.; and Ye, Paul J., to Whitehead & Kales Company. Sliding panel for an end door of a rail car. 4,077,330, Cl. 105-410.000.

Peka, Ivo; Vodicka, Ludek; Ulrich, Jan; and Hajek, Jan, to Vysoka skola chemicko-technologicka. Method for the recovery of platinum from spent catalysts. 4,077,800, Cl. 75-108.000.

Pelletier, Jacques; and Rinchet, Francois, to Agence Nationale de Valorisation de la Recherche (ANVAR). Process for the accomplishment of deep microengraving by a laser beam. 4,078,164, Cl. 219-121.0LM.

Pelosi, Jr.; Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, to Morton-Norwich Products, Inc. 5-(2-Nitrophenyl)-2-furancarboximidoyl morpholine or pyrrolidine hydrochloride. 4,078,141, Cl. 544-152.000.

Peloza, Casimir C.: *See—*
Leitheiser, Robert H.; and Peloza, Casimir C., 4,077,931, Cl. 260-29.6NR.

Pensa, Carlo, to Massey-Ferguson Services N.V. Control systems for variable capacity hydraulic machines. 4,077,744, Cl. 417-218.000.

Pentagon Industries Ltd.: *See—*
Rieder, Klaus, 4,077,167, Cl. 52-106.000.

Perego, Giuseppe. Perambulator foldable support frame. 4,077,640, Cl. 280-42.000.

Perego, Giuseppe, to Perego-Pines S.p.A. Baby carriage foldable in width and shortenable in height. 4,077,641, Cl. 280-42.000.

Perego-Pines S.p.A.: *See—*
Perego, Giuseppe, 4,077,641, Cl. 280-42.000.

Perez, Paul J.: *See—*
Fahey, William David; and Perez, Paul J., 4,078,227, Cl. 340-146.3AG.

Perkins, Rodney C. Synthetic tympanic membrane. 4,077,069, Cl. 3-1.000.

Perrot, Friedrich, to Eta A.G. Ebauches-Fabrik. Extractable barrel-arbor. 4,077,201, Cl. 58-140.00R.

Perry, Frederick John: *See—*
Lowson, Martin Vincent; Hawkings, David Leonard; Byham, Geoffrey Malcolm; and Perry, Frederick John, 4,077,741, Cl. 416-228.000.

Pertec Computer Corporation: *See—*
Fultz, Jack V., 4,078,173, Cl. 250-237.00G.
Fultz, Jack V., 4,078,192, Cl. 318-227.000.

Pertsov, Lazar Davydovich: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.

Peska, Jan: *See—*
Benes, Milan; and Peska, Jan, 4,077,963, Cl. 260-290.00V.

Peterman, Loyal M., Jr., to Abrasive Technology, Inc. Diamond gear hone. 4,077,164, Cl. 51-206.00P.

Peters, John P.; and McAmish, Larry H., to Lester Laboratories, Inc. Composition and method for electrifying a gaseous atmosphere. 4,077,914, Cl. 252-518.000.

Peterson, Glenn E.: *See—*
Seleski, Richard C.; Peterson, Glenn E.; and Schoenlein, William J., 4,077,579, Cl. 242-57.100.

Petocz, Lujza E.: *See—*
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.

Petrow, Vladimir: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,060, Cl. 424-242.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,061, Cl. 424-242.000.

Petruzzi, Vincent: *See—*
Lichtenstein, Arthur L.; Petruzzi, Vincent; and Anderson, William M., Jr., 4,077,106, Cl. 29-792.000.

Petterson, Tor H. Unattended aerosol dispenser. 4,077,542, Cl. 222-70.000.

Pfaff Industriemaschinen G.m.b.H.: *See—*
Braun, Oskar; Dobner, Reinhold; Overlach, Knud; and Pietzsch, Ludwig, 4,077,340, Cl. 112-131.000.

Pfeiffer, Gerhard: *See—*
von der Eltz, Hans-Ulrich; and Pfeiffer, Gerhard, 4,077,764, Cl. 8-18.00A.

Pfizer Inc.: *See—*
Bradner, Norman R., 4,077,157, Cl. 47-58.000.
Hess, Hans-Jurgen E.; and Schaaf, Thomas K., 4,078,021, Cl. 260-940.000.

Phelps, Byron E.: *See—*
Beausoleil, William F.; and Phelps, Byron E., 4,078,254, Cl. 364-900.000.

Phelps, James D. M.; McElroy, Alan J.; and Caleca, Vincent, to Interpace Corporation. Electric conduit assembly for transmitting electric power at UHV and EHV levels. 4,078,184, Cl. 307-147.000.

Philagro: *See—*
Lacroix, Laurent, 4,078,069, Cl. 424-272.000.

Phillips, William H. Sling. 4,077,660, Cl. 294-75.000.

Piccolo, Luigi; and Paolinelli, Antonio, to Societa' Italiana Resine S.I.R. S.p.A. Method for the manufacture of soil modifiers from waste materials of the manufacture of titanium dioxide. 4,077,794, Cl. 71-31.000.

Pietschmann, Peter; and Ludwig, Peter, to Wacker-Chemie GmbH. Process for the production of a copolymer from a gaseous monomer and a liquid monomer. 4,078,136, Cl. 526-331.000.

Pietzsch, Ludwig: *See—*
Braun, Oskar; Dobner, Reinhold; Overlach, Knud; and Pietzsch, Ludwig, 4,077,340, Cl. 112-131.000.

Pillsbury Company, The: *See—*
Womack, Kenneth L., 4,077,311, Cl. 99-355.000.

Pinaire, Lon W.; and Godwin, Robert H., to Bliss & Laughlin Industries, Incorporated. Low silhouette chair tilting control assembly. 4,077,596, Cl. 248-379.000.

Piper, James R.; and Montgomery, John A., to United States of America, Health, Education and Welfare. 6-(Bromomethyl)-2,4-diaminopteridine hydrobromide. 4,077,957, Cl. 260-251.500.

Pirlet, Robert Alfred, to Centre de Recherches Metallurgiques-Centrum voor Research de Metallurgie. Method of measuring thickness. 4,077,723, Cl. 356-163.000.

Pitney-Bowes, Inc.: *See—*
Asher, Leslie K.; Gibson, Charles E.; and Roetter, Frank T., 4,077,181, Cl. 53-78.000.

Pittendreigh, William W.: *See—*
Cohen, M. Roy; Arrington, Bruce W.; and Pittendreigh, William W., 4,077,241, Cl. 70-371.000.

Pittinger, Charles B., Jr.: *See—*
Pittinger, Charles B., Sr.; and Pittinger, Charles B., Jr., 4,077,191, Cl. 56-12.700.

Pittinger, Charles B., Sr.; and Pittinger, Charles B., Jr. Filament trimmer/mower. 4,077,191, Cl. 56-12.700.

Pittsfield Products, Inc.: *See—*
Keefer, Richard D., 4,078,036, Cl. 264-261.000.

Platt, Clark I.; and Clearman, Jack F., to Whirlpool. Pumping agitation system for an automatic washer. 4,077,239, Cl. 68-53.000.

Pletcher, Erwin C. Orthodontic bracket. 4,077,126, Cl. 32-14.00A.

Plunguian, Mark; and Cornwell, Charles E. Cellular cementitious compositions and method of producing same. 4,077,809, Cl. 106-88.000.

Pluta, Werner: *See—*
Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, 4,078,003, Cl. 260-583.00P.

Pneumatic Scale Corporation: *See—*
Scully, John W., 4,077,308, Cl. 93-19.000.

Pohl, Ludwig; Klink, Rainer; Krause, Joachim; Eidenschink, Rudolf; and Del Pino, Fernando, to Merck Patent Gesellschaft mit beschrankter Haftung. Liquid crystalline dielectric composition. 4,077,900, Cl. 252-299.000.

Polaroid Corporation: *See—*
Paglia, Richard, 4,078,241, Cl. 354-86.000.

Pomot, Jean; and Chalaye, Jean-Philippe, to L'Oreal. Cross-linked starch coated antiperspirant derivative of aluminum, process for its preparation and antiperspirant composition containing same. 4,078,051, Cl. 424-35.000.

Popeil Brothers, Inc.: *See—*
Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, 4,077,123, Cl. 30-286.000.

Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, to Popeil Brothers, Inc. Knife for a flat cutting surface. 4,077,123, Cl. 30-286.000.

Popescu, Francine. Bright nickel electroplating bath and process. 4,077,855, Cl. 204-49.000.

Porter, Wilbur A.: *See—*
United States of America, National Aeronautics and Space Administration; Parker, Donald L.; and Porter, Wilbur A., 4,078,175, Cl. 250-277.0CH.

Portion Packaging, Inc.: *See—*
Agent, J. Richard; Nielsen, Donald W.; and Cooper, Thomas A., 4,077,180, Cl. 53-37.000.

Possati, Mario, to Finike Italiana Marposs, Soc. In Accomandita Semplice di Mario Possati & C. Apparatus for measuring the taper and the

out-of-roundness of a revolutionary surface of a workpiece. 4,077,130, Cl. 33-174.00L.

Post Office, The: *See—*
Dyott, Richard Burnaby; and Stevenson, John Leslie, 4,077,699, Cl. 350-96.340.
Mac Farlane, John Hartley Trevor, 4,077,609, Cl. 254-134.3FT.

Potz, Franz, to BBC Brown, Boveri & Company Limited. Turbomachine plant comprising coupled gas turbine, synchronous electrical machine and compressor units having optional operating modes. 4,077,748, Cl. 417-319.000.

Poulsen, Peder Ulrik. Apparatus for generating an impact force. 4,077,303, Cl. 91-50.000.

Powell, Leslie Vernon: *See—*
French, Tom; Edwards, Reginald Harold; and Powell, Leslie Vernon, 4,077,453, Cl. 152-330.00L.

PPG Industries, Inc.: *See—*
Bitterice, Michael G.; and Keslar, Leroy D., 4,078,107, Cl. 428-38.000.

Prazak, Charles J.; and Park, Yong S., to Zenith Radio Corporation. Method and apparatus for screening slot-mask, stripe screen color cathode ray tubes. 4,078,239, Cl. 354-1.000.

Prentice, James S., to Exxon Research & Engineering Co. Laminated non-woven sheet. 4,078,124, Cl. 429-144.000.

Preston, Edward George; and Marritt, Clifford Russell, to Molins Limited. Particularly to the manufacture of filter-tipped cigarettes. 4,077,415, Cl. 131-76.000.

Preussag Aktiengesellschaft Metall: *See—*
Wieking, Hans Wilhelm; and Ehlers, Karl, 4,077,799, Cl. 75-71.000.

Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, to Exxon Research & Engineering Co. Hydrogenated olefine oligomers. 4,078,010, Cl. 260-676.00R.

Procter & Gamble Company, The: *See—*
Beimesch, Wayne Edward; and Walsh, Michael Andrew, 4,077,891, Cl. 252-8.800.
Borcher, Thomas A.; and Knochel, John R., 4,077,754, Cl. 425-131.100.
Gault, Terrell Wilson, 4,077,897, Cl. 252-99.000.
Johnston, James Pyott; Tate, John Robert, deceased; and Tate, Sidney Alfred, administrator, 4,077,768, Cl. 8-107.000.

Prodo, Kenneth W.; and Bender, Robert W., to Kewanee Industries. Surface-active agent. 4,077,990, Cl. 260-404.500.

Puccinelli, Jeffrey H. Two part portable chair construction. 4,077,668, Cl. 297-443.000.

Pullman Incorporated: *See—*
Adler, Franklin P., 4,077,329, Cl. 105-377.000.

Pupp, Herwig; and Andersson, Birger Otto, to AB Ziristor. Machine for the manufacture of packing containers. 4,077,829, Cl. 156-446.000.

Putter, Lutz: *See—*
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.

Quaker Oats Company, The: *See—*
Wrigglesworth, Norman A., 4,077,728, Cl. 403-186.000.

Quality Technology Ltd.: *See—*
Hempell, Leo Bruce, 4,078,236, Cl. 343-228.000.

Quebec Iron and Titanium Corporation - Fer et Titane du Quebec, Inc.: *See—*
Gueguin, Michel, 4,078,039, Cl. 423-74.000.

Quick-Set, Incorporated: *See—*
Mooney, Paul C., 4,077,087, Cl. 16-35.00R.

Radiant Pen Corporation: *See—*
Hechtle, Emil, 4,077,726, Cl. 401-209.000.

Raether, Wolfgang: *See—*
Winkelmann, Erhardt; and Raether, Wolfgang, 4,078,086, Cl. 424-326.000.

Rake, Heinrich: *See—*
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.

Ramm, Peter John: *See—*
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, 4,078,078, Cl. 424-283.000.

Ramsey, Harold Eugene: *See—*
Kremer, Fontaine Theodore, Jr.; and Ramsey, Harold Eugene, 4,077,184, Cl. 53-112.00A.

Randolph, Arthur J. Invalid vehicle. 4,077,483, Cl. 180-6.500.

Rank Xerox Ltd.: *See—*
Kito, Hidetoshi, 4,077,358, Cl. 118-658.000.

Rast, Robert Morgan, to RCA Corporation. Dual mode frequency synthesizer for a television tuning apparatus. 4,078,212, Cl. 325-421.000.

Ratay, John Michael, to RCA Corporation. Slurry process for coating particles upon the viewing-window surface of a cathode-ray tube. 4,078,095, Cl. 427-72.000.

Rausch, Karl W., Jr.: *See—*
Farrissey, William J., Jr.; and Rausch, Karl W., Jr., 4,077,922, Cl. 260-2.50N.

Ray, Elmer C. Electric switch machine for model railroads. 4,077,591, Cl. 246-415.00A.

Raychem Corporation: *See—*
Ellis, Roger M.; and Allgaier, Werner M., 4,077,692, Cl. 339-103.00M.

Raymond Lee Organization, Inc., The: *See—*
Misinchuk, Peter D., 4,077,487, Cl. 180-82.00R.
Newsom, Donald; and Newsom, Clara, 4,077,152, Cl. 46-12.000.

Raytheon Company: *See—*
Graham, Robert T., Jr.; Stevens, Robert M.; and Kinnard, Kenneth F., 4,077,718, Cl. 356-4.000.
Lelke, Helmut; Howard, Richard A.; Forte, John A., Jr.; and Levinthal, Jay G., 4,078,249, Cl. 364-200.000.

RCA Corporation: *See—*
Albrecht, George Werner, 4,078,247, Cl. 363-96.000.
Crowle, Brian, 4,078,206, Cl. 330-253.000.
Leidich, Arthur John, 4,078,207, Cl. 330-273.000.
Rast, Robert Morgan, 4,078,212, Cl. 325-421.000.
Ratay, John Michael, 4,078,095, Cl. 427-72.000.

Reams, Lowell A.; Dunlap, Thomas F.; and Fenzan, Robert K., to Ford Motor Company. Compact ceramic recuperator preheater for stirling engine. 4,077,215, Cl. 60-517.000.

Reber, Richard K.: *See—*
Fryer, Donald M.; and Reber, Richard K., 4,077,527, Cl. 214-17.00B.

Redman, Andrew Paul; and Schulte, Gary Lee, to Deere & Company. Tree shear actuator restraint system. 4,077,446, Cl. 144-34.00E.

Redmond, John Peter; Shirk, Albert; Bottiglier, Elmer John; and Zimmerman, Richard Henry, to AMP Incorporated. Method of making sensitized polyimide polymers, having catalyst and electroless metal, metal deposits thereon and circuit patterns of various metallization schemes. 4,078,096, Cl. 427-98.000.

Reece, Marvin P.: *See—*
Rosan, Jose, Jr.; and Reece, Marvin P., 4,077,427, Cl. 137-551.000.

Reedy, Donald, to Special Sports Products Corporation. Snowmobile ski keel. 4,077,639, Cl. 280-28.000.

Rehn, Gary Allen: *See—*
Steinbach, James Gerald; Rehn, Gary Allen; and Jackson, William Wayne, 4,077,651, Cl. 280-426.000.

Reiher, Wilfred L. Method for making candles. 4,077,110, Cl. 29-458.000.

Reinertz, Rudolf: *See—*
Konnemann, Alfred; and Reinertz, Rudolf, 4,077,698, Cl. 339-276.00R.

Reinschmidt, Robert M.: *See—*
Millhollan, Michael S.; and Reinschmidt, Robert M., 4,078,261, Cl. 365-189.000.

Reisender, Elizabeth A.: *See—*
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,077,844, Cl. 195-80.00R.

Reiser, John R.: *See—*
Thomas, Robert M.; and Reiser, John R., 4,077,586, Cl. 242-129.500.

Rekhi, Kanwalnain S.: *See—*
Windsor, David F.; and Rekhi, Kanwalnain S., 4,078,250, Cl. 364-715.000.

REMIX Radiotechnikai Vallalat: *See—*
Kadar, Ferenc; and Galambos, Gyula, 4,077,115, Cl. 29-630.00B.

Renold Limited: *See—*
Foster, Kenneth William Samuel, 4,077,212, Cl. 60-431.000.

Research Corporation: *See—*
Fox, Charles L., Jr., 4,078,058, Cl. 424-228.000.

Research-Cottrell, Inc.: *See—*
Hartshorn, Wayne T., 4,077,785, Cl. 55-155.000.

Restaurant Technology, Inc.: *See—*
Strong, William K., 4,077,226, Cl. 62-63.000.

Reuter, David F., to General Motors Corporation. Method of manufacturing friction plates and plates made by the method. 4,077,107, Cl. 29-400.00R.

Reuter, Peter: *See—*
Blechschmitt, Kurt; Reuter, Peter; Wirth, Friedrich; and Hornberger, Paul, 4,077,984, Cl. 260-346.400.

Rexnord Inc.: *See—*
Morris, John M., 4,078,041, Cl. 423-210.000.

Reynolds, Richard W., to Sundstrand Corporation. Hydraulic intensifier system. 4,077,746, Cl. 417-225.000.

Rhee, Young: *See—*
Chapin, Leo N.; and Rhee, Young, 4,077,802, Cl. 96-1.00R.

Rheinstahl AG: *See—*
Koppers, Manfred; and Pawelski, Ludwig, 4,077,223, Cl. 61-45.00D.

Rhoades, John Stewart; and Kulp, Gary. Arc discharge apparatus. 4,077,888, Cl. 250-543.000.

Rhoades, John Stewart; and Kulp, Gary. Arc discharge apparatus. 4,077,889, Cl. 250-543.000.

Rhone-Progil: *See—*
Chauvel, Bernard; and Daniel, Jean-Claude, 4,078,018, Cl. 260-880.00R.

Ribaldone, Giuseppe; and Grecu, Renato, to Montedison S.p.A. Method for the preparation of the monopotassium salt of 1,2,5-thiadiazol-3,4-dicarboxylic acid, and intermediate product. 4,077,966, Cl. 260-302.00D.

Ricciardi, Ronald J. Metering and wetting system. 4,077,612, Cl. 366-102.000.

Rich, Hubert Allen: *See—*
Bass, Sidney; May, Herbert; and Rich, Hubert Allen, 4,077,339, Cl. 112-121.270.

Richardson Company, The: *See—*
Muzyczko, Thaddeus M.; and Fieder, Donald W., 4,077,806, Cl. 96-115.00R.

Richardson, J. David: *See—*
Glockner, Peter W.; and Richardson, J. David, 4,078,011, Cl. 260-677.00H.

Richardson-Merrell Inc.: *See—*
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,060, Cl. 424-242.000.
Benson, Harvey D.; Grunwell, Joyce Francis; Johnston, John O'Neal; and Petrow, Vladimir, 4,078,061, Cl. 424-242.000.
Richardson, Warner G.: *See—*
Klett, Gene R.; and Richardson, Warner G., 4,077,142, Cl. 37-141.00R.
Richarz, Heinz: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Richie, Kenneth E.: *See—*
Kulikowski, Donald F.; Richie, Kenneth E.; and Pan, Peter N. Y., 4,077,543, Cl. 222-95.000.
Richtzenhain, Hermann: *See—*
Vollkommer, Norbert; Richtzenhain, Hermann; Bier, Gerhard; and Gorlitz, Manfred, 4,078,148, Cl. 560-185.000.
Ricoh Company, Ltd.: *See—*
Akamatsu, Hiroyuki, 4,077,711, Cl. 355-10.000.
Riebel, Hans-Jochem: *See—*
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.
Rieder, Klaus, to Pentagon Industries Ltd. Security window unit. 4,077,167, Cl. 52-106.000.
Riggs, Darius O.: *See—*
Mercer, Benjamin, Jr.; Riggs, Darius O.; and Vogel, Charles G., 4,077,254, Cl. 73-94.000.
Rikagaku Kenkyusho and Mitsubishi Petrochemical Company Limited: *See—*
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.
Rinchet, Francois: *See—*
Pelletier, Jacques; and Rinchet, Francois, 4,078,164, Cl. 219-121.0LM.
Ring, John H.: *See—*
Ring, Sandiford; and Ring, John H., 4,077,261, Cl. 73-706.000.
Ring, Sandiford; and Ring, John H. Instrument protective apparatus. 4,077,261, Cl. 73-706.000.
Ripka, William Charles, to Du Pont de Nemours, E. I., and Company. N-(p-methylphenethyl)-4α-aryl-trans-decahydroisoquinolines. 4,077,954, Cl. 260-289.00D.
Ritchie, Grant Edgar; and Morrison, John Malcolm, to Ferranti Limited. Current limiting circuit arrangements. 4,078,200, Cl. 323-9.000.
Rittenbach, Otto E.: *See—*
Fishbein, William; and Rittenbach, Otto E., 4,078,234, Cl. 343-9.000.
Riva, Giuseppe: *See—*
Luzzani, Umberto; and Riva, Giuseppe, 4,077,335, Cl. 108-75.000.
Robert Bosch GmbH: *See—*
Borst, Wo!fgang, 4,078,203, Cl. 328-39.000.
Fricke, Hans Jurgen, 4,077,211, Cl. 60-428.000.
Haug, Heinz; and Kas, Gunter, 4,078,161, Cl. 200-19.00R.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,377, Cl. 123-148.00S.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,379, Cl. 123-148.00S.
Rometsch, Werner; and Willmer, Horst, 4,077,745, Cl. 417-221.000.
Voegele, Guenther, 4,077,186, Cl. 53-28.000.
Robert, Marcel: *See—*
Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, 4,078,010, Cl. 260-676.00R.
Roberts, James R., to Eucatex S.A. Industria E Comercio. Fire resistant, bauxite-containing, wood composition board. 4,077,833, Cl. 162-176.000.
Robertson, John M.; Brice, John C.; and Davies, John E., to U.S. Philips Corporation. Epitaxial growth of bismuth rare earth iron garnet from a flux of bismuth oxide and alkali metal oxide. 4,077,832, Cl. 156-624.000.
Robinson, Larry Grant, to Du Pont de Nemours, E. I., and Company. Process for producing flame-resistant filaments. 4,077,929, Cl. 260-29.6AQ.
Robota, Stephen; and Whelan, James A., to Hooker Chemicals & Plastics Corporation. Method for the purification of monochlorobenzene. 4,077,850, Cl. 203-29.000.
Roby, Michael A.; and Tomblin, Glen E., to Rubbermaid Commercial Products Inc. Platform hand truck. 4,077,644, Cl. 280-47.340.
Rockwell International Corporation: *See—*
George, Peter K., 4,078,230, Cl. 365-8.000.
Rody, Jean: *See—*
Moser, Paul; and Rody, Jean, 4,077,902, Cl. 252-400.00A.
Roe, Elverton O.; and Moore, Charles Gregg, to Wooster Brush Company, The. Roller cover support for paint roller frame. 4,077,082, Cl. 15-230.110.
Roetter, Frank T.: *See—*
Asher, Leslie K.; Gibson, Charles E.; and Roetter, Frank T., 4,077,181, Cl. 53-78.000.
Rogers, Harry C., Jr.: *See—*
Banas, Conrad M.; and Rogers, Harry C., Jr., 4,078,167, Cl. 219-121.00R.
Rohm and Haas Company: *See—*
Sanderson, Frank Thomas; Kowalski, Alexander; and Kottke, Roger H., 4,077,926, Cl. 260-29.6TA.
Schlaefer, Francis W.; and Hansen, George A., 4,078,004, Cl. 260-604.00R.
Rohr, Wolfgang: *See—*
Fischer, Adolf, deceased; Hansen, Hanspeter; and Rohr, Wolfgang, 4,077,797, Cl. 71-92.000.
Rollor, Edward A., Jr.; and Hunt, Clarence H. Hair cutting and trimming apparatus. 4,077,122, Cl. 30-133.000.
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, to Neste Oy. 2,3-Di-(2,3-diiodopropoxy)-propyl cellulose and method of producing the same. 4,078,140, Cl. 536-84.000.
Rometsch, Werner; and Willmer, Horst, to Robert Bosch GmbH. Adjustment mechanism for radial-piston pump. 4,077,745, Cl. 417-221.000.
Ronson Corporation: *See—*
Kimball, Everett L., 4,077,429, Cl. 137-588.000.
Roquemore, Glenn F.: *See—*
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,727, Cl. 401-215.000.
Kramer, Steven H.; Roquemore, Glenn F.; and Joyce, James J., 4,077,807, Cl. 106-24.000.
Rorrer, Robert J.: *See—*
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., 4,077,437, Cl. 139-116.000.
Rosan Enterprises: *See—*
Rosan, Jose, Jr.; and Reece, Marvin P., 4,077,427, Cl. 137-551.000.
Rosan, Jose, Jr.; and Reece, Marvin P., to Rosan Enterprises. Leak detector valve assembly. 4,077,427, Cl. 137-551.000.
Rosati, Enzo, to Aziende Colori Nazionali Affini-ACNA S.p.A. Monoazo-dyes particularly suited to the levelled dyeing of synthetic polyamide fibers. 4,077,765, Cl. 8-41.00B.
Rose, Leslie C.: *See—*
Hamrick, Joseph T.; and Rose, Leslie C., 4,077,469, Cl. 166-59.000.
Rose, Rod A.; and Fritz, Andre, to Ciba-Geigy Corporation. Thermoplastic elastomers comprising ethylene-α-olefin copolymer, polypropylene and polybutene. 4,078,020, Cl. 260-897.00A.
Rosen, Perry: *See—*
Burri, Kaspar F.; Kienzle, Frank; and Rosen, Perry, 4,077,985, Cl. 260-346.600.
Rosen, Sidney; and Bennett, Richard Nelson, to National Instrument Company. Convertible filling machine. 4,077,441, Cl. 141-1.000.
Rosenberger, Paul C.: *See—*
Hickman, Donald A., Sr.; Hrabak, John H.; and Rosenberger, Paul C., 4,077,500, Cl. 188-106.00P.
Ross, Louis Anthony Ralph. Device for passing through pipelines. 4,077,080, Cl. 15-104.06R.
Rossi, Alessandro: *See—*
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.
Roszinski, Hilmar: *See—*
Lippsmeier, Bernd; Roszinski, Hilmar; and Stephan, Hans-Werner, 4,078,023, Cl. 260-986.000.
Roth, Helmut: *See—*
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,377, Cl. 123-148.00S.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,379, Cl. 123-148.00S.
Rothmayer, Noel Y.: *See—*
Bedell, John R.; Rothmayer, Noel Y.; Saunders, Ralph R.; and Smith, Robert W., 4,077,462, Cl. 164-429.000.
Roto-Finish Company: *See—*
Balz, Gunther W., 4,077,162, Cl. 51-163.100.
Roussel UCLAF: *See—*
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, 4,078,078, Cl. 424-283.000.
Clemence, Francois; Humbert, Daniel; and Fournex, Robert, 4,078,076, Cl. 424-283.000.
Nedelec, Lucien; Torelli, Vesperto; and Fournex, Robert, 4,078,059, Cl. 424-242.000.
Rouvellat, Richard A.; Wada, Minoru; and Yoshihara, Shoji. Textile cleaning process including soil-repellent finish. 4,077,770, Cl. 8-142.000.
Rowley, William N.: *See—*
Ehret, Gordon F.; Rowley, William N.; and Williams, Robert R., 4,077,424, Cl. 137-119.000.
Rozanski, Henry A. Swimming pool construction. 4,077,173, Cl. 52-169.800.
Rubbermaid Commercial Products Inc.: *See—*
Roby, Michael A.; and Tomblin, Glen E., 4,077,644, Cl. 280-47.340.
Ruble, Eulalia Berry, executrix: *See—*
Dollinger, Robert E.; Wright, Clinton M.; and Ruble, Theodore A., deceased, 4,077,761, Cl. 431-8.000.
Ruble, Theodore A., deceased: *See—*
Dollinger, Robert E.; Wright, Clinton M.; and Ruble, Theodore A., deceased, 4,077,761, Cl. 431-8.000.
Rubruck, Manfred: *See—*
Lang, Rainer; Matthiesen, Horst; and Rubruck, Manfred, 4,077,580, Cl. 242-58.200.
Ruckel, Erwin Richard: *See—*
Wang, Long Shyong; and Ruckel, Erwin Richard, 4,077,905, Cl. 252-429.00A.
Rudszinat, Willy, to Hauni Werke Korber & Co., KG. Apparatus for

converting a ribbon of labels into discrete labels. 4,077,289, Cl. 83-152.000.

Rue, Larry M., to Economics Laboratory, Inc. Iodine/phosphate ester compositions and methods of using them. 4,077,898, Cl. 252-106.000.

Ruhrchemie Aktiengesellschaft: *See—*
Feichtinger, Hans; Aschmann, Heinz; Birnkraut, Hans-Walter; Brinkmann, Ludwig; and Pluta, Werner, 4,078,003, Cl. 260-583.00P.

Ruiz, Lorenzo Anthony: *See—*
Popeil, Samuel J.; and Ruiz, Lorenzo Anthony, 4,077,123, Cl. 30-286.000.

Ruppel, Friedrich: *See—*
Czerwon, Dieter; Ruppel, Friedrich; and Braun, Siegfried, 4,078,033, Cl. 264-178.00R.

Rysti, Alpo. Apparatus for sequentially forwarding bodies to a conveyer. 4,077,524, Cl. 214-8.50A.

S I G Scheizerische Industrie-Gesellschaft: *See—*
Marbot, Jakob, 4,077,309, Cl. 93-27.000.

Saam, Charles W., to Harter Corporation. Chair leg base. 4,077,594, Cl. 248-188.700.

Saari, Walfred S.: *See—*
Lumma, William C., Jr.; and Saari, Walfred S., 4,078,063, Cl. 424-250.000.

Sabo, Julius Alan: *See—*
Briel, Henry Christian, Jr.; and Sabo, Julius Alan, 4,077,693, Cl. 339-126.00R.

Sachetto, Jean-Pierre: *See—*
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,078,140, Cl. 536-84.000.

St. Thomas's Hospital Medical School: *See—*
Woolner, Ronald Alfred, 4,077,395, Cl. 128-2.00F.

Saito, Yukihiro: *See—*
Asakawa, Shirow; Saito, Yukihiro; and Hasegawa, Katsue, 4,077,805, Cl. 96-115.00P.

Sakakibara, Yuji: *See—*
Ishikawa, Katuichi; Sakakibara, Yuji; Sawada, Hiraki; and Otsubo, Kizuku, 4,077,375, Cl. 123-122.0AB.

Sakata, Toshibumi: *See—*
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, 4,078,253, Cl. 364-900.000.

Sakoda, Atsunobu: *See—*
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.

Sakuma, Shinzo, to Kabushiki Kaisha Meidensha; and Kabushiki Kaisha Gemvac. Vacuum power interrupter. 4,077,114, Cl. 29-622.000.

Sakuma, Tadashi; and Hanaoka, Masatoshi, to Kabushiki Kaisha Daini Seikosha. Small sized electronic timepiece movement. 4,077,199, Cl. 58-23.0BA.

Salisbury, Clarence S.: *See—*
Simpson, Harold G.; and Salisbury, Clarence S., 4,077,171, Cl. 52-96.000.

Samuelsson, Benny Roger: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Sanderson, Frank Thomas; Kowalski, Alexander; and Kottke, Roger H., to Rohm and Haas Company. Pressure sensitive adhesive containing polymerized alkoxyalkyl ester of unsaturated carboxylic acid. 4,077,926, Cl. 260-29.6TA.

Sandhage, Ellsworth Roland; and Taylor, Arthur Sinclair, to American Cyanamid Company. Pellet implanter for animal treatment. 4,077,406, Cl. 128-217.000.

Sandoz Ltd.: *See—*
Franz, Joachim, 4,078,065, Cl. 424-261.000.

Sano, Hironobu: *See—*
Nakayama, Yoshiki; Sano, Hironobu; Okamura, Sataro; and Hirao, Kazunari, 4,078,045, Cl. 423-416.000.

Santen, Salomon, to Stork Amsterdam B.V. Treatment plant. 4,077,528, Cl. 214-18.00R.

Santier, Claudine: *See—*
Houee, Yvon; and Santier, Claudine, 4,078,158, Cl. 179-27.00D.

Sarantakis, Dimitrios, to American Home Products Corporation. Somatostatin analogs. 4,077,952, Cl. 260-112.50S.

Sato, Kozo: *See—*
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.

Sato, Makoto: *See—*
Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, 4,077,266, Cl. 73-517.00A.

Sato, Yasuhiko; and Shiobara, Toshio, to Shin-Etsu Chemical Co., Ltd. Curable organopolysiloxane compositions. 4,077,937, Cl. 260-37.0SB.

Sato, Yasuhiko, and Inomata, Hiroshi, to Shin-Etsu Chemical Co., Ltd. Curable organopolysiloxane compositions. 4,077,943, Cl. 260-46.5UA.

Sattler, Frank A., to Westinghouse Electric Corporation. High temperature high flash point non-aqueous insulating varnish. 4,077,925, Cl. 260-22.0CB.

Sauer, Donald G., to National Can Corporation. Injection molding process and apparatus. 4,077,760, Cl. 425-562.000.

Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, to Schering Aktiengesellschaft. Process for the preparation of trans-deca hydronaphthalene derivatives. 4,077,996, Cl. 260-464.000.

Saufferer, Helmut: *See—*
Willmann, Karl; and Saufferer, Helmut, 4,077,374, Cl. 123-119.00E.

Saumsiegle, Robert W.; and Harry, Ieuan L., to Continental Group, Inc., The. Mold assembly. 4,077,759, Cl. 425-451.000.

Saunders, Arthur G.: *See—*
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G., 4,077,831, Cl. 156-563.000.

Saunders, Ralph R.: *See—*
Bedell, John R.; Rothmayer, Noel Y.; Saunders, Ralph R.; and Smith, Robert W., 4,077,462, Cl. 164-429.000.

Saviers, George B., Jr.: *See—*
Horowitz, Martin, 4,077,870, Cl. 208-128.000.

Sawada, Hiraki, to Nissan Motor Company, Limited. Secondary air supply control device. 4,077,208, Cl. 60-277.000.

Sawada, Hiraki: *See—*
Ishikawa, Katuichi; Sakakibara, Yuji; Sawada, Hiraki; and Otsubo, Kizuku, 4,077,375, Cl. 123-122.0AB.

Sawyer, Willard A.: *See—*
Van Scoy, Davis A., 4,077,435, Cl. 138-93.000.

Saxby: *See—*
Oriol, Andre C., 4,077,535, Cl. 214-515.000.

Schaaf, Thomas K.: *See—*
Hess, Hans-Jurgen E.; and Schaaf, Thomas K., 4,078,021, Cl. 260-940.000.

Schabert, Hans-Peter; Irion, Leonhard; and Braun, Wolfgang, to Kraftwerk Union Aktiengesellschaft. Pressurized-water reactor coolant pipe containment. 4,077,837, Cl. 176-38.000.

Schade, Georg. Honeycomb frame for bee-hive. 4,077,075, Cl. 6-10.000.

Schafer, Walter; and Wagner, Kuno, to Bayer Aktiengesellschaft. Process for the production of modified polyisocyanates. 4,077,989, Cl. 260-404.500.

Schaper, Raymond Joseph: *See—*
Lim, Sim Koei; Bloomquist, Arnold Eugene; and Schaper, Raymond Joseph, 4,077,930, Cl. 260-29.6TA.

Schering Aktiengesellschaft: *See—*
Arndt, Friedrich; and Boroschewski, Gerhard, 4,077,798, Cl. 71-100.000.
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,077,996, Cl. 260-464.000.

Schering Corporation: *See—*
Barton, Derek H. R.; and McCombie, Stuart W., 4,078,139, Cl. 536-17.000.
Weinstein, Marvin J.; Wagman, Gerald H.; Marquez, Joseph A.; and Testa, Raymond T., 4,078,056, Cl. 424-117.000.

Scherrer, Kurt, to U. Scharer Sohne AG, (USM). Stop device for sliding compartments disposed side by side. 4,077,684, Cl. 312-220.000.

Schlaefer, Francis W.; and Hansen, George A., to Rohm and Haas Company. Methacrolein production utilizing novel catalyst. 4,078,004, Cl. 260-604.00R.

Schlegel Corporation: *See—*
Lind, Earl V., 4,078,106, Cl. 428-35.000.

Schlottmann, Herman; and Melchior, John G., to Temcor, Inc. Diverter assembly. 4,077,506, Cl. 198-367.000.

Schlueter, James B. Expansible chamber apparatus. 4,077,365, Cl. 123-43.00R.

Schlumberger Technology Corporation: *See—*
Goldman, Leonard H., 4,078,174, Cl. 250-270.000.

Schmid, Christian; Glasbrenner, Max; and Heusser, Jean, to Hommel Aktiengesellschaft. Process for manufacturing a flavone derivative. 4,078,137, Cl. 536-8.000.

Schmitter, Erich K. Cutting or bending tool. 4,077,249, Cl. 72-389.000.

Schneider, Mark R., to Fairchild Camera and Instrument Corporation. Case for an electronic wristwatch module. 4,077,200, Cl. 58-50.00R.

Schoenfeld, Simon L.; and Coussens, Eugene C., to Signetics Corporation. Ramp generator. 4,078,252, Cl. 364-858.000.

Schoenlein, William J.: *See—*
Seleski, Richard C.; Peterson, Glenn E.; and Schoenlein, William J., 4,077,579, Cl. 242-57.100.

Schottler, Henry. Fluid transducer. 4,077,267, Cl. 74-25.000.

Schrider, Michael Stanley, to American Cyanamid Company. Oral administration of pyrethroids to warm-blooded animals to prevent fly development in their droppings. 4,078,080, Cl. 424-304.000.

Schroder, Manfred: *See—*
Diebel, Klaus; and Schroder, Manfred, 4,078,005, Cl. 260-614.00R.

Schubert & Salzer: *See—*
Artzt, Peter; Bauer, Herbert; Egbers, Gerhard; and Tabibi, Sohrab, 4,078,231, Cl. 340-259.000.

Schuerer, Paul H.: *See—*
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.

Schuessler, Philipp William Hans, to International Business Machines Corporation. Water soluble flux. 4,077,815, Cl. 148-23.000.

Schulte, Gary Lee: *See—*
Redman, Andrew Paul; and Schulte, Gary Lee, 4,077,446, Cl. 144-34.00E.

Schultes, Tilmann; and Seidel, Joachim, to Kortenbach & Rauh Kommanditgesellschaft. Shortenable umbrella. 4,077,420, Cl. 135-25.00R.

Schultes, Tilmann; and Seidel, Joachim, to Kortenbach & Rauh Kommanditgesellschaft. Shortenable umbrella. 4,077,421, Cl. 135-25.00R.

Schulze, Heinz, to Texaco Development Corporation. Polyurethane catalyst. 4,077,919, Cl. 260-2.5AC.

Schumacher, Neal P.; and Ghosh, Shyamol K., to Emhart Industries, Inc. Refrigerated display case. 4,077,228, Cl. 62-256.000.

Schurger, Rainer: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.

Schuster, Hans-Dieter: *See—*
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.

Schuster, Heinz: *See—*
Lotzsch, Ulrich; and Schuster, Heinz, 4,078,122, Cl. 429-121.000.

Schutze, Horst, to Vereinigte Flugtechnische Werke-Fokker GmbH. Starting an aircraft engine and driving auxiliary, on-board equipment. 4,077,202, Cl. 60-39.140.

Schwabische Huttenwerke Gesellschaft mit beschrankter Haftung: *See—*
Gessler, Hans; and Faul, Josef, 4,077,526, Cl. 214-17.00D.

Schwappach, Dieter, to O & K Orenstein & Koppel Aktiengesellschaft. Holding construction for detachable connection of the tooth tip of a dredge tooth. 4,077,729, Cl. 403-379.000.

Schwartz, Albert B.: *See—*
Wilson, Robert C., Jr.; and Schwartz, Albert B., 4,077,910, Cl. 252-455.00Z.

Schwartz, Bradford Clyde: *See—*
Carlson, Jeffrey Allen; Schwartz, Bradford Clyde; and Steving, Gerald, 4,077,558, Cl. 228-121.000.

Scire, Felicetta: *See—*
Scire, Ronald; and Scire, Felicetta, 4,077,685, Cl. 312-246.000.

Scire, Ronald; and Scire, Felicetta. Combination cutting board and drawer. 4,077,685, Cl. 312-246.000.

SCM (Canada) Limited: *See—*
Dunlop, Alfred Norman, 4,078,116, Cl. 428-431.000.

SCM Corporation: *See—*
Nadkarni, Anil V., 4,077,816, Cl. 148-126.000.

Scully, John W., to Pneumatic Scale Corporation. Control for bag making machine. 4,077,308, Cl. 93-19.000.

Sedley, Bruce S. Metal magnetic key. 4,077,242, Cl. 70-413.000.

Seidel, Harold, to Bell Telephone Laboratories, Incorporated. Inversion using successive approximation. 4,078,256, Cl. 364-851.000.

Seidel, Joachim: *See—*
Schultes, Tilmann; and Seidel, Joachim, 4,077,420, Cl. 135-25.00R.
Schultes, Tilmann; and Seidel, Joachim, 4,077,421, Cl. 135-25.00R.

Seipp, William H.: *See—*
Soulsby, Donald R.; and Seipp, William H., 4,078,259, Cl. 364-900.000.

Sekerich, Michael, to Buildex, Inc. Drawer slide assembly. 4,077,677, Cl. 308-3.600.

Sekiya, Tetsuo: *See—*
Misato, Tomomasa; Ko, Keido; Homma, Yasuo; Konno, Kazuhiko; Hayasi, Yosio; Sekiya, Tetsuo; and Sato, Kozo, 4,078,074, Cl. 424-279.000.
Nakano, Soichi; Ishii, Yohji; Sekiya, Tetsuo; and Fujimura, Akira, 4,077,373, Cl. 123-117.00A.

Seleski, Richard C.; Peterson, Glenn E.; and Schoenlein, William J., to Columbia Ribbon & Carbon Mfg. Co., Inc. Edge alignment apparatus. 4,077,579, Cl. 242-57.100.

Sellera, Jose Manuel. Shaving device. 4,077,119, Cl. 30-41.000.

Sendzik, Klaus: *See—*
Ashauer, Karl; and Sendzik, Klaus, 4,077,680, Cl. 308-70.000.

Sensui, Kunio: *See—*
Hayashi, Yoshimasa; and Sensui, Kunio, 4,077,458, Cl. 164-11.000.

Sepulveda, Domingo: *See—*
Pane, Francis C.; and Sepulveda, Domingo, 4,077,205, Cl. 60-39.320.

Seul, Man Taik. Bicycle propulsion and speed change means. 4,077,648, Cl. 280-236.000.

Sexton, Arthur R.: *See—*
Stevens, Violete L.; Sexton, Arthur R.; and Corson, Frederick P., 4,077,991, Cl. 260-407.000.

Shannon, Suel Grant: *See—*
Coller, James Ray; and Shannon, Suel Grant, 4,077,443, Cl. 141-111.000.

Shapiro, Sydney Harold; Johnson, Dale Howard; and Nemeth, Harold Charles, to Akzona Incorporated. Automobile rinsing formulations and process for using the same. 4,078,105, Cl. 427-417.000.

Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., to United States of America, National Aeronautics and Space Administration. Sprayable low density ablator and application process. 4,077,921, Cl. 260-2.50B.

Shell Oil Company: *See—*
Glockner, Peter W.; and Richardson, J. David, 4,078,011, Cl. 260-677.00H.
Kiovsky, Thomas E., 4,077,893, Cl. 252-56.00R.

Shikibo Limited: *See—*
Yamagata, Totaro; and Banno, Shuji, 4,078,129, Cl. 526-11.000.

Shimada, Keizo; Harada, Toshiaki; and Koga, Masahiro, to Teijin Limited. Imido-quinoline dyes. 4,077,960, Cl. 260-281.0NH.

Shimano, Takashi; Orimo, Katsumi; and Yamamoto, Shoji, to Furukawa Electric Co., Ltd., The. Infinitesimal gas flow regulator. 4,077,603, Cl. 251-205.000.

Shimizu, Shigemitsu: *See—*
Imaizumi, Koji; and Shimizu, Shigemitsu, 4,077,712, Cl. 355-10.000.

Shimoda, Haruhisa: *See—*
Kajiura, Toshihiro; Masaki, Chiaki; Mori, Masahiro; Sakata, Toshibumi; and Shimoda, Haruhisa, 4,078,253, Cl. 364-900.000.

Shin-Etsu Chemical Co., Ltd.: *See—*
Sato, Yasuhiko; and Shiobara, Toshio, 4,077,937, Cl. 260-37.0SB.
Sato, Yasuhiko; and Inomata, Hiroshi, 4,077,943, Cl. 260-46.5UA.

Shindo, Akio: *See—*
Tanaka, Shigenori; Tojo, Akio; Shindo, Akio; and Ohnishi, Kimimasa, 4,077,438, Cl. 139-302.000.

Shinsei Kogyo Co., Ltd.: *See—*
Asano, Kiyoji, 4,077,156, Cl. 46-206.000.

Shiobara, Toshio: *See—*
Sato, Yasuhiko; and Shiobara, Toshio, 4,077,937, Cl. 260-37.0SB.

Shionogi & Co., Ltd.: *See—*
Maeda, Ryozo; and Hirose, Katsumi, 4,077,968, Cl. 260-306.80R.

Shirk, Albert: *See—*
Redmond, John Peter; Shirk, Albert; Bottiglier, Elmer John; and Zimmerman, Richard Henry, 4,078,096, Cl. 427-98.000.

Shoberg, Dell. Medical slide case with hinged molded sections. 4,077,515, Cl. 206-456.000.

Shorey, Thomas H., to Boeing Company, The. Integrated treadway cargo handling system. 4,077,590, Cl. 244-118.00R.

Showa Denko K.K.: *See—*
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Showa Vermiculite Kabushiki Kaisha: *See—*
Kishi, Ken, 4,078,028, Cl. 264-43.000.

Shugart Associates: *See—*
Dalziel, Warren L., 4,077,236, Cl. 64-22.000.

Shupe, Russell D.; and Maddox, Jim, Jr., to Texaco Inc. Surfactant oil recovery process usable in high temperature, high salinity formations. 4,077,471, Cl. 166-275.000.

SI Handling Systems, Inc.: *See—*
Ziegenfus, Barry L.; and Jocsak, Richard, 4,077,327, Cl. 104-35.000.

Sid Richardson Carbon & Gasoline Co.: *See—*
Dollinger, Robert E.; Wright, Clinton M.; and Ruble, Theodore A., deceased, 4,077,761, Cl. 431-8.000.

Sieckert, Edgar W.; Frayseth, Robert D.; and Breckenridge, John R., to Federal Cartridge Corporation. Sealed lay-in conduit duct. 4,077,434, Cl. 138-92.000.

Siegel, Herman: *See—*
Stanley, Joseph; and Hoerner, Griffith L., 4,077,390, Cl. 126-263.000.

Siemens Aktiengesellschaft: *See—*
Haerten, Rainer; and Kresse, Heinz, 4,077,405, Cl. 128-214.00F.
Kiesewetter, Werner; Bernhardt, Emil; and Hutterer, Robert, 4,077,317, Cl. 101-37.000.
Kunze, Dieter; Wolf, Horst-Wolfgang; and Parstorfer, Richard, 4,077,702, Cl. 350-96.210.
Lang, Rainer; Matthiesen, Horst; and Rubruck, Manfred, 4,077,580, Cl. 242-58.200.

Siemund, Herbert A.; and Wilson, Earl, to Greenview Manufacturing Company. Retainer for a sponge rubber mop. 4,077,083, Cl. 15-244.00R.

Sievers, Paul. Golf ball teeing device. 4,077,659, Cl. 294-19.00A.

Signetics Corporation: *See—*
Schoenfeld, Simon L.; and Coussens, Eugene C., 4,078,252, Cl. 364-858.000.

Signode Corporation: *See—*
Lems, Peter; and Cheung, Nelson, 4,077,313, Cl. 100-2.000.

Sila, Vladimir Nikolaevich: *See—*
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Simms, Douglas Leon; Skurkiss, Peter Kenny; and White, Clark Woody, to Bell Telephone Laboratories, Incorporated. Patterned chromate film process. 4,077,851, Cl. 204-15.000.

Simpson, David Preston, to Electricity Council, The. Boilers. 4,077,465, Cl. 165-84.000.

Simpson, Harold G.; and Salisbury, Clarence S., to Star Manufacturing Company of Oklahoma. Prefabricated watertight structural system. 4,077,171, Cl. 52-96.000.

Simpson, William G.: *See—*
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.

Singbartl, Gunther, to WABCO Westinghouse GmbH. Measuring sensing device. 4,078,185, Cl. 310-168.000.

Singer Company, The: *See—*
Fahey, William David; and Perez, Paul J., 4,078,227, Cl. 340-146.3AG.
Windsor, David F.; and Rekhi, Kanwalnain S., 4,078,250, Cl. 364-715.000.

Sircar, Shivaji; and Zondlo, John W., to Air Products and Chemicals, Inc. Hydrogen purification by selective adsorption. 4,077,779, Cl. 55-25.000.

Sivash, Konstantin Mitrofanovich. Artificial hip joint. 4,077,070, Cl. 3-1.912.

Sjostrand, Sven Erik: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Skahill, Richard John, to J. I. Case Company. Shock mount for protective structure for tractors. 4,077,655, Cl. 280-756.000.

SKF Industrial Trading & Development Co. B.V.: *See*—
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.
Skurkiss, Peter Kenny: *See*—
Koontz, Donald Eldridge; and Skurkiss, Peter Kenny, 4,077,852, Cl. 204-15.000.
Simms, Douglas Leon; Skurkiss, Peter Kenny; and White, Clark Woody, 4,077,851, Cl. 204-15.000.
Slautterback, Ernest G. Shoe polish applicator. 4,077,725, Cl. 401-17.000.
Sloan-Kettering Institute for Cancer Research: *See*—
Goldstein, Gideon, 4,077,949, Cl. 260-112.50R.
Slob, Arie: *See*—
Hart, Cornelis Maria; and Slob, Arie, 4,078,208, Cl. 330-296.000.
Sloop, Conrad Beebe. Photographic reflector accessory. 4,078,170, Cl. 362-322.000.
Smeck, Carroll I., to Olin Corporation. Treatment of sulfide-bearing waters with chlorine dioxide. 4,077,879, Cl. 210-62.000.
Smejkal, Hellmuth; Hiris, Otto; and Mayrandl, Helmut, to Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft. Metallurgical vessel lining arrangement. 4,077,616, Cl. 266-281.000.
Smith, International, Inc.: *See*—
Trzeciak, Kurt H., 4,077,657, Cl. 285-184.000.
Smith, Joseph W., to Carrier Corporation. Tube extracting mechanism. 4,077,102, Cl. 29-252.000.
Smith, Joseph W., to National Distillers and Chemical Corporation. Simplified valve for tubeless tire. 4,077,456, Cl. 152-427.000.
Smith, Larry Gene: *See*—
Lindsey, Royce Darwin; and Smith, Larry Gene, 4,078,258, Cl. 364-900.000.
Smith, Richard E., to National Gypsum Company. Predecorated gypsum wallboard for impermeable wall. 4,077,168, Cl. 52-622.000.
Smith, Robert W.: *See*—
Bedell, John R.; Rothmayer, Noel Y.; Saunders, Ralph R.; and Smith, Robert W., 4,077,462, Cl. 164-429.000.
Smits, Willem C., to Beatrice Foods. Trailer warning panel assembly. 4,077,144, Cl. 40-590.000.
Smoczynski, Frank E. Number plates for racing vehicles. 4,077,145, Cl. 40-590.000.
Snell, George J., to Lummus Company, The. Separation of insoluble material from coal liquefaction product by gravity settling. 4,077,881, Cl. 210-83.000.
Snelling, Jay B.: *See*—
EerNisse, Errol P.; Land, Cecil E.; and Snelling, Jay B., 4,078,226, Cl. 340-146.3SY.
Snellman, Donald L.; and Kuspert, John C. Book cover applicator. 4,077,078, Cl. 11-1.0AD.
Snellman, Donald L.; Kuspert, John C.; and Saunders, Arthur G. Sheet binding apparatus. 4,077,831, Cl. 156-563.000.
Snijders, Jacobus Michiel Hubertus: *See*—
Coibers, Gerardus Johannes Baptist; Einerhand, Johan Jozef; Erkens, Leonardus Johannes Hubertus; Nicola, Hubertus Bartholomeus; and Snijders, Jacobus Michiel Hubertus, 4,077,973, Cl. 260-314.500.
Sobey, Arnold John, to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Helicopter rotor blades. 4,077,740, Cl. 416-230.000.
Societa' Farmaceutici Italia, S.p.A.: *See*—
Arcamone, Federico; Bernardi, Luigi; Patelli, Bianca; and Di Marco, Aurelia, 4,077,988, Cl. 260-376.000.
Bernardi, Luigi; Foglio, Maurizio; and Francheschi, Giovanni, 4,077,969, Cl. 260-306.70C.
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.
Societa Italiana Macchine Industriali Torino, S.p.A.: *See*—
Branconi, Marcello, 4,077,140, Cl. 37-103.000.
Societa' Italiana Resine S.I.R. S.p.A.: *See*—
Paparatto, Piero; Vargiu, Silvio; Parodi, Antonio; and Passalenti, Beppino, 4,077,939, Cl. 260-40.00R.
Piccolo, Luigi; and Paolinelli, Antonio, 4,077,794, Cl. 71-31.000.
Societe Alsacienne de Constructions Mecaniques de Mulhouse: *See*—
Weber, Roger; and Lotte, Andre, 4,077,320, Cl. 101-119.000.
Societe Anonyme Automobiles Citroen: *See*—
Grosseau, Albert, 4,077,232, Cl. 64-11.00R.
S.A. Joullie International: *See*—
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,082, Cl. 424-317.000.
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,090, Cl. 424-317.000.
Societe Anonyme: Poclain: *See*—
Leyrat, Pierre Jean; and Baconet, Daniel Diony, 4,077,529, Cl. 214-145.00R.
Societe Anonyme Poclain Hydraulics: *See*—
Martin, Louis Emile; and Mauboussin, Antoine Theodore, 4,077,431, Cl. 137-596.140.
Societe d'Etudes Scientifiques et Industrielles de l'Ile-de-France: *See*—
Bulteau, Gerard; Acher, Jacques; and Monier, Jean-Claude, 4,077,976, Cl. 260-326.200.
Societe Francaise des Telephones Ericsson: *See*—
Houee, Yvon; and Santier, Claudine, 4,078,158, Cl. 179-27.00D.
Societe Industrielle de Brevets et d'Etudes S.I.B.E.: *See*—
Bockelmann, Wilfried; and Faltermeier, Georg, 4,078,024, Cl. 261-39.00B.
Societe Nationale des Poudres et Explosifs: *See*—
Lecolier, Serge L.; and Biehler, Jean-Marie J., 4,077,964, Cl. 260-293.860.
Society Said: LOGABAX: *See*—
Talvard, Jean-Pierre; Flaceliere, Bernard; and Bunel, Jacques, 4,077,336, Cl. 101-93.050.
Sohner, Gerhard: *See*—
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,377, Cl. 123-148.00S.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,379, Cl. 123-148.00S.
Solomon, Irwin J.: *See*—
Fagervold, Leroy W.; Solomon, Irwin J.; Webber, Edward; and Troudt, Jacob, 4,077,139, Cl. 37-41.000.
Sonoco Products Company: *See*—
Fletcher, Wade D.; and Norwood, Robert A., 4,077,344, Cl. 113-115.000.
Soulsby, Donald R.; and Seipp, William H., to Gulf & Western Industries, Inc. Programmable controller having a system for monitoring the logic conditions at external locations. 4,078,259, Cl. 364-900.000.
Source Proteins, Inc.: *See*—
White, Robert Wickey, 4,077,950, Cl. 260-112.00R.
Southall, Kenneth, to AMF Incorporated. Shut-off valve apparatus. 4,077,876, Cl. 210-136.000.
Spangenberg, Harold E. Internal combustion engine fuel economy improvement system. 4,077,370, Cl. 123-103.00B.
Spanke, Edwin A., to Gulf & Western Manufacturing Company. Vertically swinging article transfer apparatus. 4,077,523, Cl. 214-1.0BD.
Spassov, Kostadin Stankov: *See*—
Milkov, Angel Dimitrov; Kolarov, Miladin Ivanov; Kunchev, Nikola Tzanov; Iliev, Iliya Marinov; Spassov, Kostadin Stankov; and Buyukliev, Georgi Stoykov, 4,078,040, Cl. 423-102.000.
Spaude, Robin W.; and Bowers, Alvin L., to Parker-Hannifin Corporation. Grease gun. 4,077,493, Cl. 184-105.00A.
Spaude, Robin W.; and Bowers, Alvin L., to Parker-Hannifin Corporation. Grease gun. 4,077,494, Cl. 184-105.00A.
Special Sports Products Corporation: *See*—
Reedy, Donald, 4,077,639, Cl. 280-28.000.
Spector, Sidney: *See*—
Felix, Arthur Martin; and Spector, Sidney, 4,078,049, Cl. 424-1.000.
Spence, Junior C.; Rorrer, Robert J.; and Holt, James L., to J. P. Stevens Co., Inc. Apparatus for forming a double catch thread narrow weave. 4,077,437, Cl. 139-116.000.
Sperry Rand Corporation: *See*—
Anderson, David Robert; and Jenkins, Vaughn Junior, 4,078,193, Cl. 318-317.000.
Bennett, Clarence L., Jr.; Bohman, Carl E.; DeLorenzo, Joseph D.; and Wilhelmsen, Harald, 4,077,488, Cl. 180-98.000.
Gravel, Robert L., 4,077,803, Cl. 96-1.100.
Matthews, Hugh B., 4,077,220, Cl. 60-641.000.
Spies, Klaus; Blumental, Gunter; Bohnes, Karlheinz; and Marr, Peter, to Bochumer Eisenhutte Heintzmann GmbH & Co. Method and apparatus for advancing and supporting an underground mine gallery. 4,077,670, Cl. 299-11.000.
Spigarelli, Donald J. Method and apparatus for soldering, fusing or brazing. 4,077,467, Cl. 165-105.000.
Spinnstoffabrik Zehlendorf Aktiengesellschaft: *See*—
Lorenz, Jurgen; and Mehdorn, Frank, 4,077,880, Cl. 210-65.000.
Spivack, John D.: *See*—
Stephen, John F.; and Spivack, John D., 4,077,941, Cl. 260-45.75N.
Sponagel, Hans-Joachim: *See*—
Abthoff, Jorg; Bubeck, Gunther; Fink, Roland; Fricker, Ludwig; Gube, Karlheinz; Lammer, Jurgen; Schuster, Hans-Dieter; and Sponagel, Hans-Joachim, 4,077,368, Cl. 123-32.0ST.
Spreckelmeyer, Bernhard, to Bayer Aktiengesellschaft. Production of hydrofluoric acid from phosphate-containing fluorspar. 4,078,047, Cl. 423-485.000.
Square D Company: *See*—
Farag, Samir F., 4,077,687, Cl. 339-64.00M.
Staebler, Paul J., to Caterpillar Tractor Co. Apparatus for machining end housings for slant axis rotary mechanisms. 4,077,302, Cl. 90-13.900.
Stahlecker, Fritz; and Stahlecker, Hans. Open-end spinning aggregate. 4,077,195, Cl. 57-58.890.
Stahlecker, Hans: *See*—
Stahlecker, Fritz; and Stahlecker, Hans, 4,077,195, Cl. 57-58.890.
Standard Oil Company: *See*—
Dolhyj, Serge R.; and Milberger, Ernest C., 4,077,912, Cl. 252-461.000.
Keske, Robert G., 4,078,142, Cl. 560-19.000.
Li, George S., 4,077,947, Cl. 260-78.0UA.
Standard Oil Company (Indiana): *See*—
Bertolacini, Ralph J.; and Brennan, Harry M., 4,077,909, Cl. 252-455.00Z.
Standard Register Company, The: *See*—
Paulson, William T.; Davidson, David M., deceased; Gilbert, L. Eldean; Gabbard, Henry; and Bemus, Richard D., 4,077,824, Cl. 156-244.240.
Stanford Research Institute: *See*—
Murray, Robert G., 4,077,541, Cl. 222-1.000.
Stanley, Joseph; and Hoerner, Griffith L., to Fiedler, Marc F.; and Siegel, Herman. Reusable heat pack containing supercooled solution and means for activating same. 4,077,390, Cl. 126-263.000.

Stanley Works, The: *See—*
Stoutenberg, Carl Christian, 4,077,128, Cl. 33-138.000.

Star Manufacturing Company of Oklahoma: *See—*
Simpson, Harold G.; and Salisbury, Clarence S., 4,077,171, Cl. 52-96.000.

Starbuck, Herman S.; Jones, William Raymond; and Mahn, John Edward, to General Fabric Fusing, Inc. Method of producing certain transparent adhesive laurolactam copolyamide films. 4,078,113, Cl. 428-196.000.

Stark, Theo. Device for the control of the tension of an endless belt or screen. 4,077,834, Cl. 162-257.000.

Starke, George Robert: *See—*
Cooke, Anson Richard; and Starke, George Robert, 4,077,795, Cl. 71-78.000.

Starkweather, Howard Warner, Jr.; and Mutz, Michael Joseph, to Du Pont de Nemours, E. I., and Company. Composition of polyamide, polyethylene ionomer copolymer. 4,078,014, Cl. 260-857.00L.

Stauffer Chemical Company: *See—*
Coll-Palagos, Miguel, 4,077,853, Cl. 204-20.000.
Fancher, Llewellyn W., 4,078,079, Cl. 424-301.000.
Goswami, Jagadish C., 4,078,130, Cl. 526-17.000.
Via, Francis A., 4,077,860, Cl. 204-159.240.

Stauffer, Norman L., to Honeywell Inc. Digital auto focus. 4,078,171, Cl. 250-201.000.

Stearns, Stanley D. Method and apparatus for detection of monoalkylhalides. 4,077,773, Cl. 23-232.00R.

Steckenrider, Paul E., to Union Special Corporation. Thread trimming mechanism for sewing machines. 4,077,342, Cl. 112-292.000.

Stedman, Robert N., to Caterpillar Tractor Co. Tire protector assembly for a wheel loader. 4,077,141, Cl. 37-117.500.

Steele, Victor. Portable frame for doorway mounting of a trapeze bar. 4,077,403, Cl. 128-75.000.

Steensma, Peter Dennis; and Kao, Charles Kuen, to International Telephone and Telegraph Corporation. Method and arrangements for dispersion equalization of optical fiber transmission lines. 4,077,701, Cl. 350-96.230.

Steffen, Sylvester L. Method and structure for optimizing atmospheric environment to preserve stored food grains in the curing and post curing state. 4,077,134, Cl. 34-22.000.

Steiger, Anton, to Sulzer Brothers Limited. Method and apparatus for operating an internal combustion engine with solid fuel. 4,077,367, Cl. 123-23.000.

Steinbach, James Gerald; Rehn, Gary Allen; and Jackson, William Wayne, to Deere & Company. Hydraulic steering for plow. 4,077,651, Cl. 280-426.000.

Steininger, Alfred: *See—*
Kuhls, Jurgen; Steininger, Alfred; and Fitz, Herbert, 4,078,134, Cl. 526-204.000.

Stendel, Wilhelm: *See—*
Enders, Edgar; and Stendel, Wilhelm, 4,077,981, Cl. 260-326.850.
Maurer, Fritz; Riebel, Hans-Jochem; Homeyer, Bernhard; Behrenz, Wolfgang; Hammann, Ingeborg; and Stendel, Wilhelm, 4,078,057, Cl. 424-212.000.

Stenzel, Jurgen; and Hinz, Arnulf, to Hoechst Aktiengesellschaft. Production of material consisting of solid hollow spheroids. 4,077,908, Cl. 252-455.00R.

Stephan, Hans-Werner: *See—*
Lippsmeier, Bernd; Roszinski, Hilmar; and Stephan, Hans-Werner, 4,078,023, Cl. 260-986.000.

Stephen, John F.; and Spivack, John D., to Ciba-Geigy Corporation. Metal salts of N,N-disubstituted β-alanines and stabilized compositions. 4,077,941, Cl. 260-45.75N.

Stepochkin, Lev Mikhailovich: *See—*
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Stevens, Robert M.: *See—*
Graham, Robert T., Jr.; Stevens, Robert M.; and Kinnard, Kenneth F., 4,077,718, Cl. 356-4.000.

Stevens, Violete L.; Sexton, Arthur R.; and Corson, Frederick P., to Dow Chemical Company, The. Copolymers of glycidol and glycidyl esters. 4,077,991, Cl. 260-407.000.

Stevenson, John Leslie: *See—*
Dyott, Richard Burnaby; and Stevenson, John Leslie, 4,077,699, Cl. 350-96.340.

Stevenson, Sydney Samuel. Racks for cards and the like. 4,077,520, Cl. 211-55.000.

Steving, Gerald: *See—*
Carlson, Jeffrey Allen; Schwartz, Bradford Clyde; and Steving, Gerald, 4,077,558, Cl. 228-121.000.

Stewart, David E., to Empire Metal Products Corporation. Screen door construction. 4,077,160, Cl. 49-421.000.

Stewart, Dennis C., to United Technologies Corporation. Method and apparatus for improving the formability of sheet metal. 4,077,247, Cl. 72-325.000.

Stingl, Helmut: *See—*
Albrecht, Konrad; Frensch, Heinz; Hartel, Kurt; and Stingl, Helmut, 4,078,070, Cl. 424-273.00R.

Stith, William J.: *See—*
Geissler, Ulrich C.; Stith, William J.; and Jewett, Kathleen J., 4,077,772, Cl. 23-230.00B.

Stock, Hermann, to Stock, Hermann. Rotary drum for rotary autoclave. 4,077,679, Cl. 308-8.000.

Stockburger, Dieter: *See—*
Habermann, Wolfgang; Stockburger, Dieter; Thoma, Peter; and Csizi, Gotthard, 4,077,856, Cl. 204-149.000.

Storch, Adam, to International Installations. Plastic restaurant booth seat. 4,077,665, Cl. 297-244.000.

Stork Amsterdam B.V.: *See—*
Santen, Salomon, 4,077,528, Cl. 214-18.00R.

Stork, Edward L.: *See—*
Johnson, Anderson F., Jr.; Stork, Edward L.; and Winings, Richard H., 4,077,416, Cl. 134-159.000.

Stoutenberg, Carl Christian, to Stanley Works, The. Coilable tape rule. 4,077,128, Cl. 33-138.000.

Strain, Harvey Alec. Alcohol testers. 4,077,265, Cl. 73-445.000.

Strandlund, Gert Christer: *See—*
Berntsson, Peder Bernhard; Brandstrom, Arne Elof; Carlsson, Enar Ingemar; Carlsson, Stig Ake Ingemar; Ek, Lars; Samuelsson, Benny Roger; Sjostrand, Sven Erik; Strandlund, Gert Christer; and Ablad, Bengt Arne Hjalmar, 4,078,146, Cl. 560-160.000.

Strange, Booth B., to Western Geophysical Co. of America. Geophone and seismic cable assembly. 4,078,223, Cl. 340-7.00R.

Stringham, Roger S.: *See—*
Toy, Madeline S.; and Stringham, Roger S., 4,077,857, Cl. 204-158.00R.

Strom, Torsten Erik Theodor, to AB Gustavsberg. Machine for manufacturing reinforced tubes. 4,077,828, Cl. 156-429.000.

Strombeck, Leo; and Anderson, Ralph F., to Anderson Bros. Mfg. Co. Apparatus for applying covers to containers. 4,077,188, Cl. 53-310.000.

Strong, William K., to Restaurant Technology, Inc. Cryogenic freezer. 4,077,226, Cl. 62-63.000.

Studen, George. Golf putter. 4,077,633, Cl. 273-164.000.

Studer, Philip A.; and Evans, Harold E., to United States of America, National Aeronautics and Space Administration. Energy storage apparatus. 4,077,678, Cl. 308-10.000.

Stuhr, Hans Waldemar, to Linde Aktiengesellschaft. Hydraulic piston motor. 4,077,305, Cl. 91-486.000.

Stutz, Theo; and Zemp, Georg, to Contraves AG. Apparatus for the opto-electrical determination of a measured value. 4,077,252, Cl. 73-59.000.

Suarato, Antonino: *See—*
Foglio, Maurizio; Suarato, Antonino; Masi, Paolo; Franceschi, Giovanni; Palamidessi, Giorgio; and Bernardi, Luigi, 4,077,970, Cl. 260-306.70C.

Sugahara, Hirozo: *See—*
Nagatoshi, Kikuo; Ito, Toshimichi; Sakoda, Atsunobu; Inayoshi, Akio; Fujimoto, Noriki; Kaji, Hidehiko; and Sugahara, Hirozo, 4,078,017, Cl. 260-878.00R.

Sugiyama, Sakae: *See—*
Omori, Takashi; and Sugiyama, Sakae, 4,077,836, Cl. 176-22.000.

Sulzbach, Reinhard; Kuhls, Jurgen; and Fitz, Herbert, to Hoechst Aktiengesellschaft. Process for the manufacture of suspension polymers of tetrafluoroethylene. 4,078,135, Cl. 526-209.000.

Sulzer Brothers Limited: *See—*
Steiger, Anton, 4,077,367, Cl. 123-23.000.

Sumitomo Chemical Company, Limited: *See—*
Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, 4,077,971, Cl. 260-308.00B.
Fukusen, Hiroshi; Yamanaka, Hironori; Oishi, Sachio; and Nakao, Michito, 4,077,530, Cl. 214-152.000.

Sumitomo Metal Industries Limited: *See—*
Hashio, Moriki; and Terashima, Toshio, 4,077,457, Cl. 164-4.000.

Sumitomo Shipbuilding and Machinery Co. Ltd.: *See—*
Hashio, Moriki; and Terashima, Toshio, 4,077,457, Cl. 164-4.000.

Sumiyoshi, Masaharu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,077,363, Cl. 123-32.0SP.

Summers, Charles Gene, to Monsanto Company. N-1,3-dimethylbutyl-N'-1,4-dimethylpentyl-p-phenylenediamine. 4,078,001, Cl. 260-577.000.

Sun Oil Company Limited: *See—*
Lichtenberger, Gunter J.; and Morgan, George W., 4,077,225, Cl. 61-103.000.

Sundeen, Joseph E.: *See—*
Hauck, Frederic Peter; and Sundeen, Joseph E., 4,078,066, Cl. 424-266.000.

Sundstrand Corporation: *See—*
Reynolds, Richard W., 4,077,746, Cl. 417-225.000.

Sundstrand Data Control, Inc.: *See—*
Van Schoiack, Michael Marion, 4,078,205, Cl. 330-107.000.

Sundstrom, Nils Goran, to Atlas Copco Aktiebolag. Method and apparatus for filtering and cleaning the filter. 4,077,781, Cl. 55-96.000.

Sung, Pei; and Lee-You, James, to Johnson & Johnson. Dental solder. 4,077,560, Cl. 228-220.000.

Suprunov, Vladimir; Kryczun, Alfred; and Manshausen, Theodor, to Klockner-Humboldt-Deutz Aktiengesellschaft. Method and apparatus for treating slurries. 4,077,841, Cl. 159-47.00R.

Sutch, Brian Leo Chudleigh, to Airfix Industries Limited. Production of composite products. 4,078,037, Cl. 264-266.000.

Suzaki, Kuniyoshi, to Canon Kabushiki Kaisha. Motion picture projection apparatus. 4,077,705, Cl. 352-73.000.

Suzuki, Matsumi; and Ichikawa, Yoichi, to Fuji Xerox Co., Ltd. Voice recognition system using locus of centroid of vocal frequency spectra. 4,078,154, Cl. 179-1.0SB.

Suzuki, Seiichi; Yamaguchi, Masahiro; Takahashi, Saburo; and Nagayama, Keiji. Method of determining liquid level in a petroleum cracking reactor. 4,077,258, Cl. 73-302.000.

Suzuki, Suzuo; Isobe, Akio; and Matsuda, Kenichi, to Nissan Motor Company, Limited. Exhaust gas reburning system. 4,077,209, Cl. 60-282.000.

Svirklys, Ferdinand M., to Extrados Company Limited. Pallet construction. 4,077,334, Cl. 108-56.100.

Swager, William E. Clamping device for a rope, cable, annular bar, or the like. 4,077,094, Cl. 24-134.00R.

Swanson, Wyn K.; and Kremer, Stephen D. Three dimensional systems. 4,078,229, Cl. 340-173.0CM.

Swensrud, Roger L.: *See—*
Daugherty, Roger H.; and Swensrud, Roger L., 4,078,150, Cl. 174-15.0BH.

Swindler, Henry A., to Parker-Hannifin Corporation. Sealed joint and gasket therefor. 4,077,656, Cl. 285-110.000.

SWS Silicones Corporation: *See—*
Martin, Eugene Ray, 4,078,104, Cl. 427-387.000.

Syntex (U.S.A.) Inc.: *See—*
Walker, Keith A. M., 4,078,071, Cl. 424-273.00R.

Szirt nee Kiszelly, Eniko: *See—*
Budai, Zoltan; Lay nee Konya, Aranka; Mezei, Tibor; Grasser, Katalin; Szirt nee Kiszelly, Eniko; Kosoczky, Ibolya; and Petocz, Lujza E., 4,077,999, Cl. 260-566.0AE.

Szwarc, John J.: *See—*
Leitheiser, Robert H.; and Szwarc, John J., 4,078,015, Cl. 260-859.00R.

T. A. Pelsue Company: *See—*
Beavers, Allan E., 4,077,417, Cl. 135-3.00R.

Tabata, Junichi: *See—*
Inoue, Takehiko; Tabata, Junichi; Ohishi, Hidekatsu; and Murata, Seiichiro, 4,077,346, Cl. 114-74.00A.

Tabata, Kozo: *See—*
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Tabibi, Sohrab: *See—*
Artzt, Peter; Bauer, Herbert; Egbers, Gerhard; and Tabibi, Sohrab, 4,078,231, Cl. 340-259.000.

Takahashi, Hiroshi: *See—*
Fukuda, Tosao; and Takahashi, Hiroshi, 4,077,886, Cl. 210-198.00C.

Takahashi, Saburo: *See—*
Suzuki, Seiichi; Yamaguchi, Masahiro; Takahashi, Saburo; and Nagayama, Keiji, 4,077,258, Cl. 73-302.000.

Takahashi, Yasuhiro: *See—*
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Takahata, Yasuyo: *See—*
Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, 4,077,923, Cl. 260-2.300.

Takaishi, Naotake: *See—*
Inamoto, Yoshiaka; Fujikura, Yoshiaka; Ikeda, Hiroshi; and Takaishi, Naotake, 4,078,085, Cl. 424-325.000.

Takamatsu, Hiroshi; Sato, Makoto; Miyagawa, Yoshitaka; Arai, Yutaka; and Fujii, Etsuo, to Honda Giken Kogyo Kabushiki Kaisha. Device for detecting angular accelerations and decelerations of a vehicle road wheel. 4,077,266, Cl. 73-517.00A.

Takamitsu, Nagaaki: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,078,006, Cl. 260-621.00G.

Takashima, Hideaki: *See—*
Yamaguchi, Koji; Takashima, Hideaki; Tsurutani, Iwao; and Nagasawa, Toshio, 4,078,111, Cl. 427-120.000.

Takei, Kensuke: *See—*
Okumura, Takeo; Hayashi, Shizuo; Majima, Kanji; and Takei, Kensuke, 4,077,911, Cl. 252-550.000.

Takei, Toshihiro: *See—*
Kasagi, Takao; Kuwakado, Satosi; and Takei, Toshihiro, 4,077,423, Cl. 137-68.00A.

Takeshita, Hidetoshi: *See—*
Umehara, Noboru; and Takeshita, Hidetoshi, 4,077,244, Cl. 72-129.000.

Takeshita, Hiroshi; and Kondo, Hiroyuki, to Aisin Seiki Kabushiki Kaisha. Fluid pressure controlling device. 4,077,673, Cl. 303-24.00F.

Taki, Tsuneo: *See—*
Hamuro, Mituro; Taki, Tsuneo; and Tsuino, Yasuhiro, 4,077,439, Cl. 140-1.000.

Talvard, Jean-Pierre; Flaceliere, Bernard; and Bunel, Jacques, to Society Said: LOGABAX. Printing device for high speed printers. 4,077,336, Cl. 101-93.050.

Tamai, Shinkichi, to Kobe Dockyard & Engine Works, Ltd. Apparatus for printing upon moving sheets, paper or the like with automatic typesetting. 4,077,318, Cl. 101-37.000.

Tamamura, Takeo: *See—*
Ohuchi, Yasushi; Tamamura, Takeo; Asahi, Naotatsu; Nakayama, Makoto; Kanamaru, Hisanobu; Hamada, Arinobu; Takahashi, Yasuhiro; Tabata, Kozo; and Mitamura, Ryota, 4,077,810, Cl. 148-2.000.

Tamayama, Masaaki: *See—*
Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, 4,077,923, Cl. 260-2.300.

Tanagawa, Korzi: *See—*
Kanisawa, Hajime; and Tanagawa, Korzi, 4,078,187, Cl. 310-319.000.

Tanaka, Katsumasa: *See—*
Nishi, Satoru; and Tanaka, Katsumasa, 4,078,202, Cl. 324-61.00R.

Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, to Nittan Company, Limited. Method of manufacturing cation exchanger. 4,077,923, Cl. 260-2.300.

Tanaka, Kunihiko: *See—*
Kamiya, Takashi; Tanaka, Kunihiko; Teraji, Tsutomu; and Hemmi, Keiji, 4,077,965, Cl. 260-302.0SD.

Tanaka, Mansei: *See—*
Ayusawa, Saburo; and Tanaka, Mansei, 4,077,098, Cl. 29-33.00T.

Tanaka, Shigenori; Tojo, Akio; Shindo, Akio; and Ohnishi, Kimimasa, to Nissan Motor Company, Limited. Weft cutting device for looms. 4,077,438, Cl. 139-302.000.

Tanaka, Shigeru; and Ohnishi, Joichi, to Matsushita Electric Industrial Co., Ltd. Liquid suspending medium for electrophoretic image display/and or recording device. 4,077,936, Cl. 260-33.80R.

Tanaka, Taro: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,077,363, Cl. 123-32.0SP.

Tanaka, Yoshio, to Ideal Soap Co. Marbleized soap bar plodder. 4,077,753, Cl. 425-131.100.

Tanaka, Yukiyasu: *See—*
Noguchi, Masaaki; Sumiyoshi, Masaharu; Tanaka, Yukiyasu; and Tanaka, Taro, 4,077,363, Cl. 123-32.0SP.

Tani, Hajime, to NTN Toyo Bearing Co. Ltd. Method of working steel machine parts including machining during quench cooling. 4,077,812, Cl. 148-12.400.

Tankey, Howard William: *See—*
Bolza, Frederick; Jellinek, Thomas; Neill, Keith Gordon; and Tankey, Howard William, 4,077,820, Cl. 149-109.400.

Tanno, Toshiyuki: *See—*
Murakosi, Takeo; and Tanno, Toshiyuki, 4,078,198, Cl. 318-627.000.

Tantera, Inc.: *See—*
Clark, Frank T., Jr., 4,077,672, Cl. 300-21.000.

Tapecon, Inc.: *See—*
Fulwiler, Stanley S., 4,077,830, Cl. 156-249.000.

Tarasova, Evgenia Lvovna: *See—*
Enenshtein, Gennady Abovich; Berezovsky, Alexandr Vladimirovich; Dobrokhotova, Marina Konstantinovna; Lyadysheva, Evgenia Konstantinovna; Nosova, Larisa Alexeevna; Nurmukhomedov, Siyar Nurgalievich; Tarasova, Evgenia Lvovna; Gusakov, Sergei Sergeevich; Pertsov, Lazar Davydovich; and Ebel, Igor Alexandrovich, 4,077,946, Cl. 260-78.00L.

Tassoney, Joseph P.: *See—*
Choi, Charles K.; Morey, Booker W.; Frischmuth, Robert W.; Tassoney, Joseph P.; and Gundzik, Richard M., 4,077,847, Cl. 201-21.000.

Tate, John Robert, deceased: *See—*
Johnston, James Pyott; Tate, John Robert, deceased; and Tate, Sidney Alfred, administrator, 4,077,768, Cl. 8-107.000.

Tate, Mary, administrator: *See—*
Johnston, James Pyott; Tate, John Robert, deceased; and Tate, Sidney Alfred, administrator, 4,077,768, Cl. 8-107.000.

Tate, Sidney Alfred, administrator: *See—*
Johnston, James Pyott; Tate, John Robert, deceased; and Tate, Sidney Alfred, administrator, 4,077,768, Cl. 8-107.000.

Taubmann, Harro J.: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.

Taylor, Arthur Sinclair: *See—*
Sandhage, Ellsworth Roland; and Taylor, Arthur Sinclair, 4,077,406, Cl. 128-217.000.

Taylor, David L. Lined face for a golf club. 4,077,632, Cl. 273-164.000.

Taylor, Everett W.: *See—*
Benson, Gustav E.; and Taylor, Everett W., 4,077,084, Cl. 15-306.00A.

Taylor, Glenn. Rotary dump. 4,077,328, Cl. 105-261.00A.

Taylor, John Bodenham: *See—*
Barnes, Alan Charles; Hairsine, Peter Wilfred; Ramm, Peter John; and Taylor, John Bodenham, 4,078,078, Cl. 424-283.000.

TDK Electronics Co., Ltd.: *See—*
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.

Teijin Limited: *See—*
Shimada, Keizo; Harada, Toshiaki; and Koga, Masahiro, 4,077,960, Cl. 260-281.0NH.

Tela, Charles T., Sr. Modern roulette game. 4,077,631, Cl. 273-142.00E.

Telatemp Corporation: *See—*
Everest, Charles Eugene, 4,078,179, Cl. 250-338.000.

Teldix GmbH: *See—*
Leiber, Heinz, 4,077,217, Cl. 60-535.000.
Leiber, Heinz; Gerstenmeier, Jurgen; and Korasiak, Wolfgang, 4,077,675, Cl. 303-95.000.

Teledyne Industries, Inc.: *See—*
Deines, Siegmund, 4,077,569, Cl. 239-101.000.
Keely, W. A.; and Korneffel, R., 4,077,738, Cl. 415-36.000.
Lauer, Jay M., 4,077,861, Cl. 204-195.00P.

Telefonaktiebolaget L M Ericsson: *See—*
Hagermo, Kjell Gustaf Roland, 4,077,691, Cl. 339-95.00R.

Temcor, Inc.: *See—*
Schlottmann, Herman; and Melchior, John G., 4,077,506, Cl. 198-367.000.

Tenconi, Riccardo. Needle selecting device in a circular knitting machine. 4,077,238, Cl. 66-50.00B.
Teraji, Tsutomu: *See—*
Kamiya, Takashi; Tanaka, Kunihiko; Teraji, Tsutomu; and Hemmi, Keiji, 4,077,965, Cl. 260-302.0SD.
Terashima, Toshio: *See—*
Hashio, Moriki; and Terashima, Toshio, 4,077,457, Cl. 164-4.000.
Tesch, Sheila A.: *See—*
Bunegar, Frederick J.; and Tesch, Sheila A., 4,077,896, Cl. 252-90.000.
Tesinsky, Jerry Stanley: *See—*
United States of America, National Aeronautics and Space Administration; Anderson, George Edward; Fell, Donald Maurice; and Tesinsky, Jerry Stanley, 4,078,110, Cl. 428-93.000.
Testa, Raymond T.: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; Marquez, Joseph A.; and Testa, Raymond T., 4,078,056, Cl. 424-117.000.
Texaco Development Corporation: *See—*
Gipson, Robert Malone, 4,077,986, Cl. 260-348.290.
Schulze, Heinz, 4,077,919, Cl. 260-2.5AC.
Texaco Inc.: *See—*
Canup, Robert E., 4,077,380, Cl. 123-148.00E.
Shupe, Russell D.; and Maddox, Jim, Jr., 4,077,471, Cl. 166-275.000.
Texas Instruments Incorporated: *See—*
Bellavance, David W., 4,077,817, Cl. 148-171.000.
Cholet, Jean, 4,077,262, Cl. 73-701.000.
Hamilton, Stephen P., 4,078,251, Cl. 364-700.000.
Tezuka, Toshiro: *See—*
Miyoshi, Isao; Abe, Masaru; Tezuka, Toshiro; and Yoshimoto, Toshio, 4,077,454, Cl. 152-354.00R.
Thadani, Moti, to Vapor Corporation. Digital valve and pump control system. 4,078,196, Cl. 318-562.000.
Thaw, Allan; and Milcetich, John, to Mechanical Plastics Corporation. Attachment for hollow walls and method of repairing same. 4,077,169, Cl. 52-741.000.
Theeuwes, Felix; and Ayer, Atul D., to Alza Corporation. Osmotic devices having composite walls. 4,077,407, Cl. 128-260.000.
Theunissen, Matthias Johannes Joseph; Kramer, Roelof Pieter; and Peek, Hermanus Leonardus, to U.S. Philips Corporation. Method of manufacturing charge transfer device. 4,077,112, Cl. 29-580.000.
Thoma, Frank, to Daimler-Benz Aktiengesellschaft. Injection installation for diesel internal combustion engine. 4,077,376, Cl. 123-139.0DP.
Thoma, Peter: *See—*
Habermann, Wolfgang; Stockburger, Dieter; Thoma, Peter; and Csizi, Gotthard, 4,077,856, Cl. 204-149.000.
Thomas, Robert M.; and Reiser, John R., to General Cable Corporation. Drop wire payout apparatus. 4,077,586, Cl. 242-129.500.
Thompson, Warren Lynn; and Kurt, Lynn Edward, to Deere & Company. Tree shear actuator restraint system. 4,077,447, Cl. 144-34.00E.
Thomson-CSF: *See—*
Papuchon, Michel, 4,077,113, Cl. 29-600.000.
Thornton, John A.; and Compton, Thomas A., to Armco Steel Corporation. Method and apparatus for finishing molten metallic coatings. 4,078,103, Cl. 427-349.000.
Thorp, Erik R. Bird feeder. 4,077,361, Cl. 119-52.00R.
Thylefors, Henric Wilhelm, to Alfa-Laval AB. Sludge centrifuge. 4,077,564, Cl. 233-20.00A.
Tibbs, Robert C. Cultivator plow sweeps with extended vertical vanes connected by brace. 4,077,479, Cl. 172-730.000.
Tiemens, Ulf, to U.S. Philips Corporation. Layer-wise reproduction of three-dimensional objects by simultaneous super-position of encoded images. 4,078,177, Cl. 250-323.000.
Tillmanns, Josef, to Lindemann Maschinenfabrik GmbH. Securing means of replaceable wearing plates in smashing machines. 4,077,575, Cl. 241-285.00A.
Tirtiaux, Robert: *See—*
Prillieux, Marcel; Robert, Marcel; and Tirtiaux, Robert, 4,078,010, Cl. 260-676.00R.
Tobin, John H.: *See—*
Gavin, David F.; Fidler, Delmer A.; and Tobin, John H., 4,078,000, Cl. 260-577.000.
Toft, Kaj: *See—*
Walker, Wendell C.; Davidson, William E.; and Toft, Kaj, 4,077,143, Cl. 38-77.830.
Tojo, Akio: *See—*
Tanaka, Shigenori; Tojo, Akio; Shindo, Akio; and Ohnishi, Kimimasa, 4,077,438, Cl. 139-302.000.
Tomblin, Glen E.: *See—*
Roby, Michael A.; and Tomblin, Glen E., 4,077,644, Cl. 280-47.340.
Tommasini, Raffaele: *See—*
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Melloni, Piero; Della Torre, Arturo; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,073, Cl. 424-278.000.
Torelli, Vesperto: *See—*
Nedelec, Lucien; Torelli, Vesperto; and Fournex, Robert, 4,078,059, Cl. 424-242.000.
Torre, Arturo Della: *See—*
Melloni, Piero; Torre, Arturo Della; Lauria, Francesco; Passerini, Norina; Rossi, Alessandro; and Tommasini, Raffaele, 4,078,072, Cl. 424-275.000.
Torrington Company, The: *See—*
Bhateja, Chander Prakash; and Alling, Richard Lassen, 4,077,683, Cl. 308-235.000.
Toshin Seiko Kabushiki Kaisha: *See—*
Udo, Isao; Kai, Tatsuya; and Kuwashiro, Masahiro, 4,077,614, Cl. 266-159.000.
Toy, Madeline S.; and Stringham, Roger S., to United States of America, Air Force. Method for the preparation of perfluoroethers. 4,077,857, Cl. 204-158.00R.
Toyo Boseki Kabushiki Kaisha: *See—*
Kuroki, Tomio; and Kazuhiro, Teramae, 4,077,771, Cl. 8-196.000.
Toyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Aoki, Keiji, 4,077,364, Cl. 123-32.0EH.
Trammel, Gary Lee. Percussion cap forming tool. 4,077,246, Cl. 72-328.000.
Transco Inc.: *See—*
Val Verde, Emanuel, 4,077,331, Cl. 105-463.000.
Travaglio, Dalny: *See—*
Ginn, LeRoy Dry; Ginn, LeRoyce Sloe; and Travaglio, Dalny, 4,077,567, Cl. 236-49.000.
Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 5-Substituted derivatives of dipyrazolo[1,5-a:4',3'-e]pyrazine-6-carboxylic acids and esters. 4,077,956, Cl. 260-250.0BC.
Tricot, Roland: *See—*
Mathern, Guy; Lefevre, Jean; Tricot, Roland; and Guessier, Andre, 4,077,108, Cl. 29-403.000.
Trofimov, Boris Alexandrovich; Atavin, Alexandr Spiridonovich; Mikhaleva, Albina Ivanovna; Kalabin, Gennady Alexandrovich; and Chebatareva, Ekaterina Grigorievna. 1-Vinyl-4,5,6,7-tetrahydroindole and preparation thereof. 4,077,975, Cl. 260-319.100.
Troudt, Jacob: *See—*
Fagervold, Leroy W.; Solomon, Irwin J.; Webber, Edward; and Troudt, Jacob, 4,077,139, Cl. 37-41.000.
Trubiano, Antoine. Adjustable display rack. 4,077,522, Cl. 211-175.000.
Trygve Liljedahl Skistavfabrikk A/S: *See—*
Liljedahl, Trygve, 4,077,091, Cl. 24-77.00R.
Trzeciak, Kurt H., to Smith, International, Inc. Adjustable bent sub. 4,077,657, Cl. 285-184.000.
TSC Industries, Inc.: *See—*
Burenga, Thomas I., 4,077,747, Cl. 417-234.000.
Tsuino, Yasuhiro: *See—*
Hamuro, Mituro; Taki, Tsuneo; and Tsuino, Yasuhiro, 4,077,439, Cl. 140-1.000.
Tsunekawa, Tokuichi: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.
Tsurutani, Iwao: *See—*
Yamaguchi, Koji; Takashima, Hideaki; Tsurutani, Iwao; and Nagasawa, Toshio, 4,078,111, Cl. 427-120.000.
Tuckerman, Louis Bryant, III, to International Business Machines Corporation. Block-cipher cryptographic system with chaining. 4,078,152, Cl. 178-22.000.
Tung, Chin: *See—*
Chen, Tien Chi; Eswaran, Kapali P.; Lum, Vincent Yu-Sun; and Tung, Chin, 4,078,260, Cl. 364-900.000.
Turner Electric Corporation: *See—*
Turner, John L., 4,078,162, Cl. 200-48.00A.
Turner, John L., to Turner Electric Corporation. Blade lock for electric switch. 4,078,162, Cl. 200-48.00A.
Tuttle, Frederick L.: *See—*
Kisslinger, Robert L.; Barnes, Benny B.; and Tuttle, Frederick L., 4,077,518, Cl. 206-583.000.
Tuttle, William D., to Grumman Aerospace Corporation. Semi-automatic feed laser apparatus. 4,078,165, Cl. 219-121.00L.
Twichell, Paul M., to Guertin Brothers, Inc. Stone setting press. 4,077,284, Cl. 81-7.000.
Tyson, Youree. Keyholder. 4,077,243, Cl. 70-459.000.
Tzschoppe, Eberhard; and Weinlich, Jurgen, to Hoechst Aktiengesellschaft. Apparatus for the manufacture of vinyl chloride polymers. 4,077,135, Cl. 34-57.00R.
U C B Societe Anonyme: *See—*
Loffet, Albert, 4,077,951, Cl. 260-112.50R.
U. Scharer Sohne AG, (USM): *See—*
Scherrer, Kurt, 4,077,684, Cl. 312-220.000.
UBE Industries, Ltd.: *See—*
Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, 4,078,006, Cl. 260-621.00G.
Yamaguchi, Koji; Takashima, Hideaki; Tsurutani, Iwao; and Nagasawa, Toshio, 4,078,111, Cl. 427-120.000.
Uchidoi, Masanori: *See—*
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, 4,078,242, Cl. 354-139.000.
Uchiyama, Shigeru, to Kabushiki Kaisha Kawai Gakki Seisakusho. Sample hold arrangement for a key signal in an electronic musical instrument. 4,077,293, Cl. 84-1.010.
Uchiyama, Takashi; Nakamura, Zenzo; Tsunekawa, Tokuichi; Uchidoi, Masanori; Mashimo, Yukio; and Ohtaki, Shyohei, to Canon Kabushiki Kaisha. Flash light photographic systems. 4,078,242, Cl. 354-139.000.
Udo, Isao; Kai, Tatsuya; and Kuwashiro, Masahiro, to Toshin Seiko Kabushiki Kaisha. Steelmaking apparatus. 4,077,614, Cl. 266-159.000.
Ueda, Sueo, to Yoshiya Nishizaki. Spin casting reel. 4,077,587, Cl. 242-215.000.

Ueng, Ming-Shean: *See*—
Cycowicz, Izchak; Caldwell, Robert Joseph; and Ueng, Ming-Shean, 4,077,663, Cl. 297-83.000.

Ueoka, Hisayoshi: *See*—
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.

Ugata, Ken; Morita, Yasuji; Mine, Yasuharu; and Izaki, Hiroshi, to Kubota, Ltd. Method for making disposable model for precision investment casting. 4,078,035, Cl. 264-221.000.

Ugine Aciers: *See*—
Mathern, Guy; Lefevre, Jean; Tricot, Roland; and Guessier, Andre, 4,077,108, Cl. 29-403.000.

Ukai, Akitoshi; and Usui, Yutaka, to Nisshin Oil Mills, Ltd., The. Hydroxy acid esters of higher alcohols. 4,078,147, Cl. 560-180.000.

Ulrich, Jan: *See*—
Peka, Ivo; Vodicka, Ludek; Ulrich, Jan; and Hajek, Jan, 4,077,800, Cl. 75-108.000.

Umehara, Noboru; and Takeshita, Hidetoshi, to Hitachi, Ltd. Method of and apparatus for continuously winding a rectangular wire. 4,077,244, Cl. 72-129.000.

Umemura, Sumio; Takamitsu, Nagaaki; Hamamoto, Toshikazu; and Kuroda, Nobuyuki, to UBE Industries, Ltd. Process for preparing dihydric phenol derivatives. 4,078,006, Cl. 260-621.00G.

Umezawa, Hamao: *See*—
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.

Umezawa, Sumio: *See*—
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.

Unami, Miwako: *See*—
Koizumi, Toshimichi; and Unami, Miwako, 4,077,704, Cl. 350-218.000.

Underwater and Marine Equipment Limited: *See*—
Humphrey, Kenneth Michael, 4,077,218, Cl. 60-592.000.

Union Carbide Corporation: *See*—
Bibeau, Alexander Armand, 4,078,112, Cl. 427-444.000.
Cooke, Anson Richard; and Starke, George Robert, 4,077,795, Cl. 71-78.000.
Doshi, Kishore Jasraj, 4,077,780, Cl. 55-26.000.
Frey, Paul Howard; and Kupcikevicius, Vytautas, 4,077,090, Cl. 17-41.000.
Halvorson, Thomas Gilbert; and Eardley, Edward Paul, 4,077,338, Cl. 110-235.000.
Noshay, Allen; and Karol, Frederick John, 4,077,904, Cl. 252-429.00R.
Weinberg, Kurt; and Johnson, Gordon Carlton, 4,077,944, Cl. 260-75.00R.

Union Special Corporation: *See*—
Steckenrider, Paul E., 4,077,342, Cl. 112-292.000.

United Kingdom Atomic Energy Authority: *See*—
Cooke-Yarborough, Edmund Harry, 4,077,216, Cl. 60-520.000.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Gray, George William; and McDonnell, Damien Gerard, 4,077,260, Cl. 73-356.000.
Sobey, Arnold John, 4,077,740, Cl. 416-230.000.

United States of America
Agriculture: *See*—
Kotter, James I.; Hassenboehler, Charles B.; and Folk, Craig L., 4,077,196, Cl. 57-58.950.
Air Force: *See*—
Toy, Madeline S.; and Stringham, Roger S., 4,077,857, Cl. 204-158.00R.
Army: *See*—
Fishbein, William; and Rittenbach, Otto E., 4,078,234, Cl. 343-9.000.
Energy: *See*—
EerNisse, Errol P.; Land, Cecil E.; and Snelling, Jay B., 4,078,226, Cl. 340-146.3SY.
Lindemer, Terrence B.; Long, Ernest L., Jr.; and Beatty, Ronald L., 4,077,838, Cl. 176-68.000.
Health, Education and Welfare: *See*—
Papahadjopoulos, P. Demetrios, 4,078,052, Cl. 424-36.000.
Piper, James R.; and Montgomery, John A., 4,077,957, Cl. 260-251.500.
National Aeronautics and Space Administration; administrator; with respect to an invention of:
Anderson, George Edward; Fell, Donald Maurice; and Tesinsky, Jerry Stanley. Flexible pile thermal barrier insulator. 4,078,110, Cl. 428-93.000.
Parker, Donald L.; and Porter, Wilbur A. Apparatus for use in examining the lattice of a semiconductor wafer by X-ray diffraction. 4,078,175, Cl. 250-277.0CH.
Wiebe, Ervin R. Multistation refrigeration system. 4,077,231, Cl. 62-514.00R.
Wilson, Irvin J. Method of producing complex aluminum alloy parts of high temper, and products thereof. 4,077,813, Cl. 148-12.70A.
National Aeronautics and Space Administration: *See*—
Chu, Ting L., 4,077,818, Cl. 148-174.000.
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.
Studer, Philip A.; and Evans, Harold E., 4,077,678, Cl. 308-10.000.
Woollam, John A., 4,077,788, Cl. 62-48.000.
Navy: *See*—
Beno, Lawrence A., 4,078,214, Cl. 333-7.00D.
Beno, Lawrence A., 4,078,217, Cl. 333-97.00S.
Folen, Vincent J.; Vittoria, Carmine; Webb, Denis C.; and Davis, Kenneth L., 4,078,186, Cl. 310-313.000.
Funk, Albert G.; and Hansen, Gary L., 4,077,326, Cl. 102-67.000.
Kaloi, Cyril M., 4,078,237, Cl. 343-700.0MS.
Kisslinger, Robert L.; Barnes, Benny B.; and Tuttle, Frederick L., 4,077,518, Cl. 206-583.000.
Mohon, Windell N., 4,077,721, Cl. 356-124.000.
Woodruff, Thomas E., 4,078,222, Cl. 340-6.00R.

U.S. Philips Corporation: *See*—
Bonis, Maurice, 4,078,244, Cl. 357-46.000.
Chapron, Claude; and Kaire, Jean-Claude, 4,078,199, Cl. 323-1.000.
Hart, Cornelis Maria; and Slob, Arie, 4,078,208, Cl. 330-296.000.
Robertson, John M.; Brice, John C.; and Davies, John E., 4,077,832, Cl. 156-624.000.
Theunissen, Matthias Johannes Joseph; Kramer, Roelof Pieter; and Peek, Hermanus Leonardus, 4,077,112, Cl. 29-580.000.
Tiemens, Ulf, 4,078,177, Cl. 250-323.000.
van Gils, Wilhelmus Adrianus, 4,077,899, Cl. 252-181.400.

United States Steel Corporation: *See*—
Gainer, Larry G.; and Wylie, Thomas G., 4,077,848, Cl. 201-41.000.
Green, Donald T., 4,078,180, Cl. 250-358.00R.
Lothmann, Joseph, 4,077,552, Cl. 222-600.000.

United Technologies Corporation: *See*—
Banas, Conrad M.; and Rogers, Harry C., Jr., 4,078,167, Cl. 219-121.00R.
Katz, Murray; and Kaufman, Arthur, 4,078,119, Cl. 429-13.000.
Pane, Francis C.; and Sepulveda, Domingo, 4,077,205, Cl. 60-39.320.
Stewart, Dennis C., 4,077,247, Cl. 72-325.000.

Universal Pneumatic Controls, Inc.: *See*—
Ginn, LeRoy Dry; Ginn, LeRoyce Sloe; and Travaglio, Dalny, 4,077,567, Cl. 236-49.000.

University of Illinois Foundation: *See*—
Farnsworth, Norman R.; Cordell, Geoffrey A.; and Ogura, Masaru, 4,078,145, Cl. 560-126.000.

University of Minnesota, Regents of the: *See*—
Larson, E. Virgil, 4,077,227, Cl. 62-74.000.

University of Southern California: *See*—
Whelan, James M., 4,078,044, Cl. 423-376.000.
Whelan, James M., 4,078,046, Cl. 423-437.000.

Upjohn Company, The: *See*—
Farrissey, William J., Jr.; and Rausch, Karl W., Jr., 4,077,922, Cl. 260-2.50N.
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,077,844, Cl. 195-80.00R.

USM Corporation: *See*—
Bennett, Robert Gordon, Jr.; and Parrella, Alfred Theodore, 4,077,163, Cl. 51-165.770.

Usui, Kayoko: *See*—
Tanaka, Kiichi; Gomyo, Noboru; Usui, Kayoko; Takahata, Yasuyo; and Tamayama, Masaaki, 4,077,923, Cl. 260-2.300.

Usui, Yutaka: *See*—
Ukai, Akitoshi; and Usui, Yutaka, 4,078,147, Cl. 560-180.000.

Vadovic, Charles J.: *See*—
Nahas, Nicholas C.; and Vadovic, Charles J., 4,077,778, Cl. 48-202.000.

Val Verde, Emanuel, to Transco Inc. Cargo rack. 4,077,331, Cl. 105-463.000.

Valchev, Alexander Yordanov: *See*—
Peev, Vassil Georgiev; Valchev, Alexander Yordanov; Ninov, Emil Pantaleev; Koychev, Todor Yankov; Krestenyakov, Yordan Ivanov; Parashkevov, Hristo Nenchev; Dersarkisyan, Avedis Mardik; Lyubenov, Hristo Krumov; Nenov, Borimir Nanov; and Genev, Ivan Vassilev, 4,077,357, Cl. 118-321.000.

Valere, Eugene. Device for selectively positioning the arm of a record player. 4,077,635, Cl. 274-23.00R.

Valley National Bank: *See*—
Liuzzo, Christy N., 4,077,323, Cl. 101-407.00R.

Van Dyk & Company, Incorporated: *See*—
Isermann, Howard P.; and Ciaudelli, Joseph P., 4,078,054, Cl. 424-60.000.

van der Lely, Ary: *See*—
van der Lely, Cornelis; and van der Lely, Ary, 4,077,477, Cl. 172-114.000.

van der Lely, Cornelis. Prefabricated structural elements, and box-shaped building sections formed from such elements. 4,077,170, Cl. 52-79.100.

van der Lely, Cornelis. Soil cultivating implements. 4,077,476, Cl. 172-49.000.

van der Lely, Cornelis; and van der Lely, Ary, to C. van der Lely N.V. Soil cultivating implements. 4,077,477, Cl. 172-114.000.

Vanderveer, Ramon D.; and Dugan, William P., to General Dynamics. Electroforming anode shields. 4,077,864, Cl. 204-285.000.

Van Doorn, Donald W.; and Harmon, William A., to Lummus Industries, Inc. Apparatus for handling and dispersing modules of seed cotton. 4,077,531, Cl. 214-309.000.

van Gils, Wilhelmus Adrianus, to U.S. Philips Corporation. Gettering device of manufacturing a color television display tube while using said gettering device, and color television display tube thus manufactured. 4,077,899, Cl. 252-181.400.
van Heuven, Jan Willem; and Bloebaum, Roelof Karl, to Nederlandse Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek. Composite dynamic membrane. 4,077,885, Cl. 210-193.000.
van Manen, Dick T., to Voplex Corporation. Interlock with inside of cylinder. 4,077,550, Cl. 222-327.000.
Van Schoiack, Michael Marion, to Sundstrand Data Control, Inc. Electronic filter circuit. 4,078,205, Cl. 330-107.000.
Van Scoy, Davis A., to Sawyer, Willard A. Pipeline plugging apparatus. 4,077,435, Cl. 138-93.000.
van Wegen, Wilhelmus F. S. M., to Metaverpa N.V. Wire or band strapping machine. 4,077,314, Cl. 100-26.000.
Vanzo, Edward, to Xerox Corporation. Method of producing toner particles by in-situ polymerization and imaging process. 4,077,804, Cl. 96-1.0SD.
Vapor Corporation: *See—*
Thadani, Moti, 4,078,196, Cl. 318-562.000.
Vargiu, Silvio: *See—*
Paparatto, Piero; Vargiu, Silvio; Parodi, Antonio; and Passalenti, Beppino, 4,077,939, Cl. 260-40.00R.
Varta Batterie Aktiengesellschaft: *See—*
Costenoble, Ullrich, 4,078,123, Cl. 429-141.000.
Lotzsch, Ulrich; and Schuster, Heinz, 4,078,122, Cl. 429-121.000.
Vaughen, Jack F. Dynamic fluid system for improving stability of a fluid cushion vehicle. 4,077,489, Cl. 180-124.000.
Vaught, Donald K.: *See—*
Dortch, Charles W.; and Vaught, Donald K., 4,077,645, Cl. 280-204.000.
VAW Leichmetall GmbH: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Vayrynen, Lauri. Electric filter. 4,077,784, Cl. 55-146.000.
Venuto, Paul B.: *See—*
Owen, Hartley; Venuto, Paul B.; and Yan, Tsoung-Yuan, 4,077,866, Cl. 208-9.000.
Vepa AG: *See—*
Fleissner, Hans, 4,077,466, Cl. 165-89.000.
Vercoulen, Johannes C. A., to Oce-van der Grinten, N.V. Copying apparatus with moving belt for transferring images. 4,077,713, Cl. 355-16.000.
Vereinigte Flugtechnische Werke-Fokker GmbH: *See—*
Schutze, Horst, 4,077,202, Cl. 60-39.140.
Vereinigte Osterreichische Eisen- und Stahlwerke-Alpine Montan Aktiengesellschaft: *See—*
Smejkal, Hellmuth; Hiris, Otto; and Mayrandl, Helmut, 4,077,616, Cl. 266-281.000.
Via, Francis A., to Stauffer Chemical Company. Photopolymerizable composition stabilized with ammonium salts of phosphorus acid and process. 4,077,860, Cl. 204-159.240.
Viessmann, Klaus: *See—*
Kreidler, Alfred; and Viessmann, Klaus, 4,077,814, Cl. 148-13.200.
Vinson, Billy Herman, to Altec Corporation. Electronic filter circuit. 4,078,215, Cl. 333-70.00R.
Vittoria, Carmine: *See—*
Folen, Vincent J.; Vittoria, Carmine; Webb, Denis C.; and Davis, Kenneth L., 4,078,186, Cl. 310-313.000.
Vladislavlev, Jury Evgenievich: *See—*
Ioannesian, Rolen Arsenievich; Ioanesian, Jury Rolenovich; Paly, Polikarp Avtonomovich; Konstantinov, Leonid Pavlovich; and Vladislavlev, Jury Evgenievich, 4,077,482, Cl. 175-340.000.
Vlattas, Isidoros, to Ciba-Geigy Corporation. 9-Thiaprostaglandins. 4,077,979, Cl. 260-332.100.
Vlattas, Isidoros, to Ciba-Geigy Corporation. 9-Thiaprostaglandins. 4,077,980, Cl. 260-332.20A.
Vodicka, Ludek: *See—*
Peka, Ivo; Vodicka, Ludek; Ulrich, Jan; and Hajek, Jan, 4,077,800, Cl. 75-108.000.
Voegele, Guenther, to Robert Bosch GmbH. Method and apparatus for making packages. 4,077,186, Cl. 53-28.000.
Vogel, Charles G.: *See—*
Mercer, Benjamin, Jr.; Riggs, Darius O.; and Vogel, Charles G., 4,077,254, Cl. 73-94.000.
Vogel, K. Stuart, to Jamak Incorporated. Pneumatic oven door gasket. 4,077,389, Cl. 126-190.000.
Vogt, Berthold Richard: *See—*
Wade, Peter C.; and Vogt, Berthold Richard, 4,077,958, Cl. 260-268.0TR.
Voith Getriebe KG: *See—*
Nitsche, Martin; Weinrich, Hellmut; and Muhlberger, Uwe, 4,077,502, Cl. 192-4.00B.
Volat, Jean-Pierre: *See—*
Fardeau, Michel; Duthion, Louis; and Volat, Jean-Pierre, 4,077,322, Cl. 101-129.000.
Volkswagenwerk Aktiengesellschaft: *See—*
Ashauer, Karl; and Sendzik, Klaus, 4,077,680, Cl. 308-70.000.
Henning, Bodo, 4,077,277, Cl. 74-501.00P.
Kluge, Erwin; and Becker, Burckhardt, 4,077,275, Cl. 74-473.00R.
Vollkommer, Norbert; Richtzenhain, Hermann; Bier, Gerhard; and Gorlitz, Manfred, to Dynamit Nobel Aktiengesellschaft. Polyether esters. 4,078,148, Cl. 560-185.000.
vom Dorp, Heinz; and Wolters, Hermann, to W. Hegenscheidt Gesellschaft mbH, Firma. Vertical boring and turning mill. 4,077,286, Cl. 82-2.00D.
von der Eltz, Hans-Ulrich; and Pfeiffer, Gerhard, to Hoechst Aktiengesellschaft. Process for the continuous dyeing of textile polyamide fiber material with metal complex dyes. 4,077,764, Cl. 8-18.00A.
von der Eltz, Hans-Ulrich, to Hoechst Aktiengesellschaft. Process for the continuous dyeing of cellulose fibers or mixtures thereof with synthetic fibers with water-in-soluble azo dyestuffs developing on the fiber. 4,077,766, Cl. 8-44.000.
von Philipp, Fritz, to Globol-Werk GmbH, Firma. Machine for the automatic assembly of vaporizers. 4,077,183, Cl. 53-111.00R.
Voplex Corporation: *See—*
van Manen, Dick T., 4,077,550, Cl. 222-327.000.
Vrana, Miroslav, to Dietiker, Hans A. Apparatus for continuously conveying and simultaneously turning objects of arbitrary shape and size. 4,077,166, Cl. 51-420.000.
Vysoka skola chemicko-technologicka: *See—*
Peka, Ivo; Vodicka, Ludek; Ulrich, Jan; and Hajek, Jan, 4,077,800, Cl. 75-108.000.
W. Hegenscheidt Gesellschaft mbH, Firma: *See—*
vom Dorp, Heinz; and Wolters, Hermann, 4,077,286, Cl. 82-2.00D.
W. R. Grace & Co.: *See—*
Moyer, Joseph Donald; and Kramm, David Edward, 4,078,118, Cl. 428-521.000.
Wszolek, Walter R., 4,077,935, Cl. 260-31.80R.
WABCO Westinghouse GmbH: *See—*
Singbartl, Gunther, 4,078,185, Cl. 310-168.000.
Wacker-Chemie GmbH: *See—*
Pietschmann, Peter; and Ludwig, Peter, 4,078,136, Cl. 526-331.000.
Wacker, Manfred: *See—*
Lacroix, Roger; Wacker, Manfred; and Lambert, Claude, 4,077,775, Cl. 23-254.00E.
Wactor, Gerald E. Body garment. 4,077,065, Cl. 2-93.000.
Wada, Minoru: *See—*
Rouvellat, Richard A.; Wada, Minoru; and Yoshihara, Shoji, 4,077,770, Cl. 8-142.000.
Wade, Peter C.; and Vogt, Berthold Richard, to E. R. Squibb & Sons, Inc. 2-[(Substituted piperazinyl)alkyl]-2,3-dihydro-3-hydroxy-1H-benz[de]isoquinolin-1-ones. 4,077,958, Cl. 260-268.0TR.
Wagman, Gerald H.: *See—*
Weinstein, Marvin J.; Wagman, Gerald H.; Marquez, Joseph A.; and Testa, Raymond T., 4,078,056, Cl. 424-117.000.
Wagner, Eugene R.; and Mueller, Larry G., to Dow Chemical Company, The. Novel hypolipidemic 2-(3,5-di-tert-butyl-4-hydroxyphenyl)thio carboxamides. 4,078,084, Cl. 424-324.000.
Wagner, Kuno: *See—*
Schafer, Walter; and Wagner, Kuno, 4,077,989, Cl. 260-404.500.
Walberg, Arvid C. Fast discharge electrostatic coating system. 4,077,354, Cl. 118-12.000.
Walker, Keith A. M., to Syntex (U.S.A.) Inc. Derivatives of substituted N-alkyl imidazoles. 4,078,071, Cl. 424-273.00R.
Walker, Wendell C.; Davidson, William E.; and Toft, Kaj, to General Electric Company. Steam iron. 4,077,143, Cl. 38-77.830.
Wallace, Robert P. Driver for helical thread inserts. 4,077,101, Cl. 29-240.500.
Waller, Campbell Ernst, to Wiltshire Cutlery Company Proprietary Ltd. Nut cracker. 4,077,121, Cl. 30-120.300.
Walsh, Michael Andrew: *See—*
Beimesch, Wayne Edward; and Walsh, Michael Andrew, 4,077,891, Cl. 252-8.800.
Walter, Lothar: *See—*
Ernst, Horst Manfred; Olschewski, Armin; Schurger, Rainer; Walter, Lothar; Brandenstein, Manfred; and Burkl, Erich, 4,077,504, Cl. 192-98.000.
Walton, Edward: *See—*
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,067, Cl. 424-272.000.
Christensen, Burton G.; Morin, Robert B.; and Walton, Edward, 4,078,068, Cl. 424-272.000.
Waly, Adnan, to Izon Corporation. Illumination distribution system for microrecord reader. 4,077,707, Cl. 353-27.00R.
Wang, Long Shyong; and Ruckel, Erwin Richard, to Arizona Chemical Company. Novel catalyst system. 4,077,905, Cl. 252-429.00A.
Ward, Donald E. Keratoplasty device. 4,077,411, Cl. 128-303.00R.
Ward, John William; and Leinbach, Richard Klein, to Eastman Kodak Company. Lens shift mechanism. 4,077,710, Cl. 355-3.00R.
Wardlaw, Stephen Clark; Levine, Robert Aaron; and Massey, James Vincent, III. Material layer volume determination. 4,077,396, Cl. 128-2.00F.
Warolin, Christian Jean Marie: *See—*
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,082, Cl. 424-317.000.
Lakah, Lucien; Maillard, Gabriel; Joullie, Maurice; and Warolin, Christian Jean Marie, 4,078,090, Cl. 424-317.000.
Washington, Freddie L.: *See—*
Cromie, Harry W.; Fitzgerald, James A.; Kopp, Clinton V.; and Washington, Freddie L., 4,077,578, Cl. 242-18.00G.
Watanabe, Mamoru: *See—*
Kitamura, Ko; Watanabe, Mamoru; Iwamura, Kimihiko; and Chino, Kenichi, 4,078,166, Cl. 219-216.000.
Watanabe, Yukiyasu: *See—*
Noda, Hiroshi; and Watanabe, Yukiyasu, 4,078,235, Cl. 343-9.000.
Waterbury, Nelson J. Vendable reclosable beverage container. 4,077,538, Cl. 220-268.000.
Watkins, Fred E., to Camco, Incorporated. Well safety valve. 4,077,473, Cl. 166-323.000.

Watkins, William Andrew. Bicycle trailer. 4,077,646, Cl. 280-204.000.
Watson, James J., Jr., to Carrier Corporation. Oval bell concept. 4,077,559, Cl. 228-154.000.
Waukesha Bearings Corporation: *See—*
Gardner, Willis W., 4,077,682, Cl. 308-160.000.
Way, Lee V., Jr. Portable solar cooker and the solar panel used therein. 4,077,391, Cl. 126-270.000.
Way, Merton B. Deep sea fishing reel. 4,077,582, Cl. 242-219.000.
Weatherford/Lamb, Inc.: *See—*
Dane, Burlie Newton, 4,077,470, Cl. 166-244.00R.
Weaver, Dale L., to Dale Weaver, Inc. Transportable water injection plant. 4,077,428, Cl. 137-567.000.
Webb, David D.: *See—*
Sharpe, Max H.; Hill, William E.; Simpson, William G.; Carter, James M.; Brown, Edwin L.; King, Harry M.; Schuerer, Paul H.; and Webb, David D., 4,077,921, Cl. 260-2.50B.
Webb, Denis C.: *See—*
Folen, Vincent J.; Vittoria, Carmine; Webb, Denis C.; and Davis, Kenneth L., 4,078,186, Cl. 310-313.000.
Webb, Lewis W., Jr. Motor mount for a boat. 4,077,353, Cl. 115-41.00R.
Webber, Edward: *See—*
Fagervold, Leroy W.; Solomon, Irwin J.; Webber, Edward; and Troudt, Jacob, 4,077,139, Cl. 37-41.000.
Weber, Roger; and Lotte, Andre, to Societe Alsacienne de Constructions Mecaniques de Mulhouse. Suspension device for squeegee-supporting tubes in rotary screen printer. 4,077,320, Cl. 101-119.000.
Wech, Robert J., to FMC Corporation. Bag machine cycle interrupt. 4,077,306, Cl. 93-8.00R.
Wedel, Carroll J., to Chevron Research Company. Thermal stabilization of polypyrrolidone against reversion to monomer. 4,077,940, Cl. 260-45.70P.
Wedge, Thomas E.: *See—*
Boothroyd, Rodney L.; Wedge, Thomas E.; and Aine, Harry E., 4,077,177, Cl. 52-741.000.
Weinberg, Kurt; and Johnson, Gordon Carlton, to Union Carbide Corporation. Catalytic production of polyesters. 4,077,944, Cl. 260-75.00R.
Weinlich, Jurgen: *See—*
Tzschoppe, Eberhard; and Weinlich, Jurgen, 4,077,135, Cl. 34-57.00R.
Weinrich, Hellmut: *See—*
Nitsche, Martin; Weinrich, Hellmut; and Muhlberger, Uwe, 4,077,502, Cl. 192-4.00B.
Weinstein, Marvin J.; Wagman, Gerald H.; Marquez, Joseph A.; and Testa, Raymond T., to Schering Corporation. Antibiotic complex from micromonospora arborensis. 4,078,056, Cl. 424-117.000.
Weiss, Ernst H. G.: *See—*
Bishop, Alfred A.; Weiss, Ernst H. G.; and Engel, Fred C., 4,077,835, Cl. 176-18.000.
Weiss, George. Wash-and-wear garment placket, collar and cuffs. 4,077,066, Cl. 2-129.000.
Weissman, Walter: *See—*
Moritz, Karsten H.; and Weissman, Walter, 4,077,869, Cl. 208-127.000.
Wellco Carpet Corporation: *See—*
Hawkins, James W., 4,077,343, Cl. 112-410.000.
Welton, Gerry D.: *See—*
Brinkley, Robie G.; and Welton, Gerry D., 4,077,422, Cl. 137-68.00R.
Wenner, Ralph B. Method and apparatus for fabricating a continuous length of cleated belting. 4,078,032, Cl. 264-167.000.
Werner, Peter: *See—*
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,377, Cl. 123-148.00S.
Jundt, Werner; Bodig, Bernd; Roth, Helmut; Sohner, Gerhard; and Werner, Peter, 4,077,379, Cl. 123-148.00S.
Werzalik-Pressholzwerk J.F. Werz Jr. KG: *See—*
Munk, Edmund E.; and Haas, Herbert G., 4,078,030, Cl. 264-109.000.
Wesch, William E. Pipe closure apparatus. 4,077,250, Cl. 73-49.800.
Wessling, Diether, to Bayer Aktiengesellschaft. Process for the halogenation of copper phthalocyanine. 4,077,974, Cl. 260-314.500.
West Electric Company, Ltd.: *See—*
Kaneko, Yoshikazu; and Ogura, Hisashi, 4,078,240, Cl. 354-33.000.
West Point Pepperell, Inc.: *See—*
Jenkins, Ellis H., 4,077,497, Cl. 188-65.100.
Western Electric Co., Inc.: *See—*
Briel, Henry Christian, Jr.; and Sabo, Julius Alan, 4,077,693, Cl. 339-126.00R.
McPherson, Charles Allen, 4,077,927, Cl. 260-23.70N.
Western Geophysical Co. of America: *See—*
Strange, Booth B., 4,078,223, Cl. 340-7.00R.
Westinghouse Air Brake Company: *See—*
Morris, Robert B., 4,077,501, Cl. 188-218.0XL.
Wright, Raymond C., 4,077,617, Cl. 267-65.00D.
Westinghouse Electric Co., Inc.: *See—*
Johnson, Anderson F., Jr.; Stork, Edward L.; and Winings, Richard H., 4,077,416, Cl. 134-159.000.
Westinghouse Electric Corporation: *See—*
Bishop, Alfred A.; Weiss, Ernst H. G.; and Engel, Fred C., 4,077,835, Cl. 176-18.000.
Brown, Jack T., 4,078,125, Cl. 429-145.000.
Daugherty, Roger H.; and Swensrud, Roger L., 4,078,150, Cl. 174-15.0BH.
Driver, Michael C.; and Kim, He B., 4,077,111, Cl. 29-571.000.
Hodgson, Alfred W.; and Collins, James D., 4,078,218, Cl. 335-128.000.
Hodgson, Alfred W., 4,078,219, Cl. 335-167.000.
Martin, Jack; and Kulkarni, Avinash D., 4,078,188, Cl. 313-222.000.
McCaskey, Harold O., Jr.; and Palazzolo, Salvatore E., 4,077,652, Cl. 280-610.000.
Sattler, Frank A., 4,077,925, Cl. 260-22.0CB.
Whirlow, Donald K.; Aldworth, John G.; and Wilburn, Garlington C., 4,078,149, Cl. 174-15.00R.
Westland Aircraft Limited: *See—*
Lowson, Martin Vincent; Hawkings, David Leonard; Byham, Geoffrey Malcolm; and Perry, Frederick John, 4,077,741, Cl. 416-228.000.
Westvaco Corporation: *See—*
Obenshain, David Noel, 4,077,291, Cl. 83-499.000.
Weyerhaeuser Company: *See—*
Hasenwinkle, Earl D.; Pangilinan, Ernesto M.; and Wislocker, Frank, 4,077,448, Cl. 144-118.000.
Wheelabrator-Frye Inc.: *See—*
Pedersen, John A., 4,077,508, Cl. 198-666.000.
Whelan, James A.: *See—*
Robota, Stephen; and Whelan, James A., 4,077,850, Cl. 203-29.000.
Whelan, James M., to University of Southern California. Process for the catalytic oxidation of ammonia and methane to hydrogen cyanide. 4,078,044, Cl. 423-376.000.
Whelan, James M., to University of Southern California. Process for the catalytic oxidation of carbon monoxide with sulfur dioxide and water. 4,078,046, Cl. 423-437.000.
Whirlow, Donald K.; Aldworth, John G.; and Wilburn, Garlington C., to Westinghouse Electric Corporation. Vapor lift pump for vapor-cooled transformers. 4,078,149, Cl. 174-15.00R.
Whirlpool: *See—*
Platt, Clark I.; and Clearman, Jack F., 4,077,239, Cl. 68-53.000.
White, Clark Woody: *See—*
Simms, Douglas Leon; Skurkiss, Peter Kenny; and White, Clark Woody, 4,077,851, Cl. 204-15.000.
White, Robert Wickey, to Source Proteins, Inc. Process for the recovery of substantially water-soluble non-toxic protein compounds from fresh non-woody vegetation. 4,077,950, Cl. 260-112.00R.
White, Ronald E.: *See—*
Pelosi, Jr.; Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,078,141, Cl. 544-152.000.
Whitehead & Kales Company: *See—*
Peisner, Israel D.; and Ye, Paul J., 4,077,330, Cl. 105-410.000.
Whiteley, Isaac C. Forced air circulation heating unit. 4,077,388, Cl. 126-121.000.
Wiebe, Donald, to A. Stucki Company. Railway truck movement damping. 4,077,496, Cl. 188-33.000.
Wiebe, Ervin R.: *See—*
United States of America, National Aeronautics and Space Administration; and Wiebe, Ervin R., 4,077,231, Cl. 62-514.00R.
Wiechert, Rudolf: *See—*
Sauer, Gerhard; Eder, Ulrich; Haffer, Gregor; Neef, Gunter; and Wiechert, Rudolf, 4,077,996, Cl. 260-464.000.
Wiegardt, Gordon K.: *See—*
Casterton, Robert Henry; and Wiegardt, Gordon K., 4,077,490, Cl. 180-143.000.
Wieking, Hans Wilhelm; and Ehlers, Karl, to Preussag Aktiengesellschaft Metall. Method and apparatus of refining crude cadmium. 4,077,799, Cl. 75-71.000.
Wiesbock, Josef, to Hans Kolb GmbH & Co., Firma. Inertia type wind up device for safety web belt. 4,077,585, Cl. 242-107.40B.
Wilburn, Garlington C.: *See—*
Whirlow, Donald K.; Aldworth, John G.; and Wilburn, Garlington C., 4,078,149, Cl. 174-15.00R.
Wildpaner, Hubert: *See—*
Jager, Gernot; Wildpaner, Hubert; Herchenbach, Horst; Rake, Heinrich; Putter, Lutz; and Lepers, Heinrich, 4,077,763, Cl. 432-14.000.
Wiley, Paul F.: *See—*
Marshall, Vincent P.; Elrod, David W.; Koert, James M.; Reisender, Elizabeth A.; and Wiley, Paul F., 4,077,844, Cl. 195-80.00R.
Wilhelmsen, Harald: *See—*
Bennett, Clarence L., Jr.; Bohman, Carl E.; DeLorenzo, Joseph D.; and Wilhelmsen, Harald, 4,077,488, Cl. 180-98.000.
Williams, Inc.: *See—*
Hagen, Glenn E., 4,077,213, Cl. 60-500.000.
Williams, Robert R.: *See—*
Ehret, Gordon F.; Rowley, William N.; and Williams, Robert R., 4,077,424, Cl. 137-119.000.
Willmann, Karl; and Saufferer, Helmut, to Daimler-Benz Aktiengesellschaft. Injection valve for internal combustion engines. 4,077,374, Cl. 123-119.00E.
Willmer, Horst: *See—*
Rometsch, Werner; and Willmer, Horst, 4,077,745, Cl. 417-221.000.
Wilson, Earl: *See—*
Siemund, Herbert A.; and Wilson, Earl, 4,077,083, Cl. 15-244.00R.
Wilson, Irvin J.: *See—*
United States of America, National Aeronautics and Space Administration; and Wilson, Irvin J., 4,077,813, Cl. 148-12.70A.
Wilson, Robert C., Jr.; and Schwartz, Albert B., to Mobil Oil Corporation. Hydrocarbon conversion over activated erionite. 4,077,910, Cl. 252-455.00Z.
Wilson, Robert M., to Dare Products, Incorporated. Fence wire mount and insulator. 4,077,611, Cl. 256-10.000.

Wilson, William. Process container. 4,077,613, Cl. 366-213.000.
Wiltshire Cutlery Company Proprietary Ltd.: *See—*
Waller, Campbell Ernst, 4,077,121, Cl. 30-120.300.
Wilwerding, Dennis J., to Honeywell Inc. Continuous automatic focus system. 4,078,172, Cl. 250-201.000.
Windsor, David F.; and Rekhi, Kanwalnain S., to Singer Company, The. Log-antilog conversion for a digital radar system. 4,078,250, Cl. 364-715.000.
Winings, Richard H.: *See—*
Johnson, Anderson F., Jr.; Stork, Edward L.; and Winings, Richard H., 4,077,416, Cl. 134-159.000.
Winkelmann, Erhardt; and Raether, Wolfgang, to Hoechst Aktiengesellschaft. Anthraquinone-bis-amidines and process for preparing them. 4,078,086, Cl. 424-326.000.
Winkelried, Irwin. Foot health aid appliance. 4,077,546, Cl. 222-179.000.
Winner, Frank Edward: *See—*
Bowden, Woodrow Raleigh; Hills, William H.; and Winner, Frank Edward, 4,077,197, Cl. 57-156.000.
Winter, Horst H. Viscosity measuring device and method. 4,077,251, Cl. 73-59.000.
Wirt, Leon A., to Caterpillar Tractor Co. Hydraulic circuit for tree harvester. 4,077,445, Cl. 144-3.00D.
Wirth, Friedrich: *See—*
Blechschmitt, Kurt; Reuter, Peter; Wirth, Friedrich; and Hornberger, Paul, 4,077,984, Cl. 260-346.400.
Wisconsin Alumni Research Foundation: *See—*
McNeary, James J., 4,078,151, Cl. 178-18.000.
Wislocker, Frank: *See—*
Hasenwinkle, Earl D.; Pangilinan, Ernesto M.; and Wislocker, Frank, 4,077,448, Cl. 144-118.000.
Wohltman, Leon: *See—*
Cunningham, Dean; Goeckner, Ralph; Alwardt, Marlin; and Wohltman, Leon, 4,077,116, Cl. 29-727.000.
Wolf, Gerhard: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 4,077,245, Cl. 72-250.000.
Wolf, Horst-Wolfgang: *See—*
Kunze, Dieter; Wolf, Horst-Wolfgang; and Parstorfer, Richard, 4,077,702, Cl. 350-96.210.
Wolf, Karlheinz: *See—*
Baurecht, Heinz-Ewald; Hornle, Reinhold; Erdmenger, Rudolf; Muller, Gerd; and Wolf, Karlheinz, 4,077,972, Cl. 260-314.500.
Wolters, Hermann: *See—*
vom Dorp, Heinz; and Wolters, Hermann, 4,077,286, Cl. 82-2.00D.
Womack, Kenneth L., to Pillsbury Company, The. Food roasting or boiling apparatus and method. 4,077,311, Cl. 99-355.000.
Woodruff, Thomas E., to United States of America, Navy. Direction determining apparatus. 4,078,222, Cl. 340-6.00R.
Woodson, Craig. Variable pitch drum. 4,077,297, Cl. 84-411.00R.
Woollam, John A., to United States of America, National Aeronautics and Space Administration. Atomic hydrogen storage method and apparatus. 4,077,788, Cl. 62-48.000.
Woolner, Ronald Alfred, to St. Thomas's Hospital Medical School. Apparatus for taking blood samples from a living patient. 4,077,395, Cl. 128-2.00F.
Wooster Brush Company, The: *See—*
Roe, Elverton O.; and Moore, Charles Gregg, 4,077,082, Cl. 15-230.110.
World Energy Systems: *See—*
Hamrick, Joseph T.; and Rose, Leslie C., 4,077,469, Cl. 166-59.000.
Worms, Karl-Heinz: *See—*
Blum, Helmut; and Worms, Karl-Heinz, 4,077,997, Cl. 260-502.40P.
Worner, Gunter: *See—*
Hornig, Rudolf; Beeskow, Bruno; and Worner, Gunter, 4,077,233, Cl. 64-11.00R.
Wrigglesworth, Norman A., to Quaker Oats Company, The. Distortion of plastic parts aligns non-coaxial members. 4,077,728, Cl. 403-186.000.
Wright, Clinton M.: *See—*
Dollinger, Robert E.; Wright, Clinton M.; and Ruble, Theodore A., deceased, 4,077,761, Cl. 431-8.000.
Wright, George C.: *See—*
Pelosi, Jr.; Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,078,141, Cl. 544-152.000.
Wright, James, to Cement Asbestos Products Company. Non-stressed, high strength, cement-containing pipe and its production. 4,077,577, Cl. 242-7.220.
Wright, John T., to Champion International Corporation. Method of producing a guarding cover for racks and the like. 4,077,823, Cl. 156-212.000.
Wright, Raymond C., to Westinghouse Air Brake Company. Vehicle leveling valve device with dampening arrangement. 4,077,617, Cl. 267-65.00D.
Wristers, Harry J., to Exxon Research & Engineering Co. Preparation of an active olefin polymerization catalyst. 4,077,903, Cl. 252-429.00C.
Wszolek, Walter R., to W. R. Grace & Co. Plastisol composition comprising (a) copolymer of olefin and maleic acid, and (b) polyester plasticizer. 4,077,935, Cl. 260-31.80R.
Wu, Yao Hua; and Lobeck, Walter G., Jr., to Mead Johnson & Company. 10-(Bis-pyrrolinyl)acridans. 4,077,959, Cl. 260-279.00R.
Wust, Manfred: *See—*
Roman, Alain; Sachetto, Jean-Pierre; Wust, Manfred; and Cuccolo, Sergio, 4,078,140, Cl. 536-84.000.
Wylain, Inc.: *See—*
Ehret, Gordon F.; Rowley, William N.; and Williams, Robert R., 4,077,424, Cl. 137-119.000.
Wyle, Frank S.; and Keiter, Edward F., to Wyle Laboratories. Cut-off machine. 4,077,161, Cl. 51-98.00R.
Wyle Laboratories: *See—*
Wyle, Frank S.; and Keiter, Edward F., 4,077,161, Cl. 51-98.00R.
Wylie, Thomas G.: *See—*
Gainer, Larry G.; and Wylie, Thomas G., 4,077,848, Cl. 201-41.000.
Xerox Corporation: *See—*
Borostyan, Stephen; Connolly, Douglas P.; and Friske, Alan D., 4,077,709, Cl. 355-3.0TR.
Camphausen, Don L., 4,077,700, Cl. 350-96.130.
Huber, Charles L., 4,077,519, Cl. 209-74.00R.
Pacansky, Thomas J.; and Becker, James H., 4,077,324, Cl. 101-450.000.
Pacansky, Thomas J.; and Amidon, Alan B., 4,077,325, Cl. 101-467.000.
Vanzo, Edward, 4,077,804, Cl. 96-1.0SD.
Yaeger, Marshall J. Projecting kaleidoscope. 4,077,706, Cl. 353-1.000.
Yamada, Shigeru: *See—*
Hiyoshi, Teruo; Nakada, Akira; Yamada, Shigeru; Ichikawa, Kiyoshi; and Isii, Sigeki, 4,077,294, Cl. 84-1.230.
Yamagata, Totaro; and Banno, Shuji, to Shikibo Limited. Process for separating polyvinyl alcohol from its solution. 4,078,129, Cl. 526-11.000.
Yamaguchi, Hiroaki: *See—*
Hattori, Tadashi; Nakase, Takamichi; and Yamaguchi, Hiroaki, 4,077,207, Cl. 60-276.000.
Yamaguchi, Koji; Takashima, Hideaki; Tsurutani, Iwao; and Nagasawa, Toshio, to UBE Industries, Ltd. Process of extrusion-coating the central core with an insulator of high pressure-processed polyethylene. 4,078,111, Cl. 427-120.000.
Yamaguchi, Masahiro: *See—*
Suzuki, Seiichi; Yamaguchi, Masahiro; Takahashi, Saburo; and Nagayama, Keiji, 4,077,258, Cl. 73-302.000.
Yamamoto, Shoji: *See—*
Shimano, Takashi; Orimo, Katsumi; and Yamamoto, Shoji, 4,077,603, Cl. 251-205.000.
Yamamoto, Takashi: *See—*
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.
Yamanaka, Hironori: *See—*
Fukusen, Hiroshi; Yamanaka, Hironori; Oishi, Sachio; and Nakao, Michito, 4,077,530, Cl. 214-152.000.
Yamashita, Yoshinari: *See—*
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, 4,077,915, Cl. 252-521.000.
Yamazaki, Hiroyuki: *See—*
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, 4,077,615, Cl. 266-201.000.
Yan, Tsoung-Yuan: *See—*
Owen, Hartley; Venuto, Paul B.; and Yan, Tsoung-Yuan, 4,077,866, Cl. 208-9.000.
Yano, Akifumi: *See—*
Nagasaki, Katsumi; Inoue, Yoshihiro; Yamazaki, Hiroyuki; Yano, Akifumi; and Momose, Tetsuo, 4,077,615, Cl. 266-201.000.
Yates, Curtis D. Wire connecting devices. 4,077,697, Cl. 339-274.000.
Ye, Paul J.: *See—*
Peisner, Israel D.; and Ye, Paul J., 4,077,330, Cl. 105-410.000.
Yoda, Tohru, to Nifco Inc. Plastic screw grommet. 4,077,300, Cl. 85-80.000.
Yodogawa, Masatada; Miyabayashi, Susumu; Yamashita, Yoshinari; Yamamoto, Takashi; Hayashi, Kohji; and Ueoka, Hisayoshi, to TDK Electronics Co., Ltd. Non-linear resistor. 4,077,915, Cl. 252-521.000.
Yoneta, Toshio: *See—*
Akita, Eiichi; Horiuchi, Yukio; Miyazawa, Takeo; Yoneta, Toshio; Umezawa, Sumio; and Umezawa, Hamao, 4,078,138, Cl. 536-10.000.
Yoneya, Kiyoo: *See—*
Kando, Akiyoshi; and Yoneya, Kiyoo, 4,078,109, Cl. 428-62.000.
Yonkers, Robert A.: *See—*
Herrick, Wallace D.; and Yonkers, Robert A., 4,077,120, Cl. 30-43.500.
Yoshida, Akitoshi; Kosaka, Masaharu; and Kitajima, Akira, to Nissan Chemical Industries, Ltd. Process for preparing mold. 4,078,029, Cl. 264-63.000.
Yoshida Kogyo K.K.: *See—*
Kando, Akiyoshi; and Yoneya, Kiyoo, 4,078,109, Cl. 428-62.000.
Yoshihara, Shoji: *See—*
Rouvellat, Richard A.; Wada, Minoru; and Yoshihara, Shoji, 4,077,770, Cl. 8-142.000.
Yoshimoto, Toshio: *See—*
Miyoshi, Isao; Abe, Masaru; Tezuka, Toshiro; and Yoshimoto, Toshio, 4,077,454, Cl. 152-354.00R.
Yoshiya Nishizaki: *See—*
Ueda, Sueo, 4,077,587, Cl. 242-215.000.
Young, Sanford Tyler; and Hill, Kenneth Lee, to FMC Corporation. 5-Benzyloxy-1,3-dioxanes. 4,077,982, Cl. 260-340.700.
Yoyota Jidosha Kogyo Kabushiki Kaisha: *See—*
Kato, Takashi, 4,078,025, Cl. 261-41.00D.
Yu, Chia Nien: *See—*
Pelosi, Jr.; Stanford S.; White, Ronald E.; Wright, George C.; and Yu, Chia Nien, 4,078,141, Cl. 544-152.000.

Yuda, Takuo, to Nifco Inc. Strain relief grommet. 4,077,085, Cl. 16-2.000.

Yukuta, Toshio; Ohashi, Takashi; and Arai, Katsuhiko, to Bridgestone Tire Company Limited. Flame- and smoke-resistant polyurethane foam and a method for producing said foam. 4,077,920, Cl. 260-2.5AM.

Yurecko, John M.: *See*—
Kulka, Kurt; Zazula, Teodosij; and Yurecko, John M., 4,077,916, Cl. 252-522.000.

Yutaka, Kondo: *See*—
Fujita, Taira; Yutaka, Kondo; Abe, Nozomi; and Akamatsu, Takashi, 4,077,971, Cl. 260-308.00B.

Zahid, Abduz, to Greer Hydraulics, Inc. Method of forming pressure accumulator. 4,077,100, Cl. 29-157.00R.

Zahn, Willy, to Zimmer Aktiengesellschaft. Apparatus for take-up and storage of thread bundles. 4,077,752, Cl. 425-72.00S.

Zaidan, Joseph Maurice. Coupling for tubular scaffolding. 4,077,730, Cl. 403-385.000.

Zapp, Walter. Fine tuning peg. 4,077,295, Cl. 84-304.000.

Zazula, Teodosij: *See*—
Kulka, Kurt; Zazula, Teodosij; and Yurecko, John M., 4,077,916, Cl. 252-522.000.

Zbinden & Co.: *See*—
Muller, Arthur E., 4,077,865, Cl. 204-297.00W.

Zeewy, Abraham; and Geringer, Donald, to Cecil Equipment Company, The. Proportional control for guidance system. 4,078,197, Cl. 318-626.000.

Zemp, Georg: *See*—
Stutz, Theo; and Zemp, Georg, 4,077,252, Cl. 73-59.000.

Zenda, Richard J.: *See*—
Malacheski, Joseph J.; and Zenda, Richard J., 4,077,544, Cl. 222-95.000.

Zenith Radio Corporation: *See*—
Lange, Howard G., 4,077,717, Cl. 355-133.000.
Prazak, Charles J.; and Park, Yong S., 4,078,239, Cl. 354-1.000.

Zhuravlev, Vitaly Ivanovich: *See*—
Makeev, Boris Anatolievich; Stepochkin, Lev Mikhailovich; Batozsky, Vadim Ivanovich; Khodorov, Alexandr Iosifovich; Burchenko, Jury Petrovich; Sila, Vladimir Nikolaevich; Korot, Garri Moiseevich; Eremenko, Adolf Grigorievich; and Zhuravlev, Vitaly Ivanovich, 4,077,287, Cl. 83-92.000.

Ziegenfus, Barry L.; and Jocsak, Richard, to SI Handling Systems, Inc. Turntable with a vehicle rotary drive shaft and external transmission means. 4,077,327, Cl. 104-35.000.

Ziehm, Kurt F., Jr. Desalination apparatus. 4,077,849, Cl. 202-205.000.

Zimmer Aktiengesellschaft: *See*—
Heinze, Helmut; and Hackel, Eberhard, 4,077,945, Cl. 260-75.00M.
Zahn, Willy, 4,077,752, Cl. 425-72.00S.

Zimmer, Johannes. Adjustable mount for rotary screen. 4,077,321, Cl. 101-128.100.

Zimmerman, Richard Henry: *See*—
Redmond, John Peter; Shirk, Albert; Bottiglier, Elmer John; and Zimmerman, Richard Henry, 4,078,096, Cl. 427-98.000.

Zoland, Martin. Expandable bag. 4,077,451, Cl. 150-31.000.

Zondlo, John W.: *See*—
Sircar, Shivaji; and Zondlo, John W., 4,077,779, Cl. 55-25.000.

LIST OF DEFENSIVE PUBLICATIONS

APPLICANTS TO WHOM

DEFENSIVE PUBLICATIONS WERE ISSUED ON THE 7TH DAY OF MARCH, 1978

Published at the request of the applicant or owner in accordance with the Notice of Dec. 16, 1969, 869 O. G. 687.

Baxter, William F., Jr.; Douglas, Ted L.; and Irick, Gether. Polyurethane foam stabilized against scorch with a mixture of hydroquinone and a phosphite containing secondary antioxidant. T968,002, 3-7-78, Cl. 260-2.5BB.

Douglas, Ted L.: *See*—
Baxter, William F., Jr.; Douglas, Ted L.; and Irick, Gether, T968,002, Cl. 260-2.5BB.

Irick, Gether: *See*—
Baxter, William F., Jr.; Douglas, Ted L.; and Irick, Gether, T968,002, Cl. 260-2.5BB.

Poist, John E. Coagulation of epoxy ester-acrylic emulsions. T968,001, 3-7-78, Cl. 260-23.0EP.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 7TH DAY OF MARCH, 1978

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Alpha Metals, Inc.: *See*—
Manko, Howard H., Re. 29,563, Cl. 228-263.000.

Braun, Eric A., to Ex-Cell-O Corporation. Carton sealing apparatus. Re. 29,568, Cl. 156-580.200.

Breimer, Hendrik; and Tan, Sing Long, to U.S. Phillips Corporation. Television system having aperture correction. Re. 29,570, Cl. 358-37.000.

Brudy, Peter E., to Dominion Auto Accessories Limited. Foldable emergency reflecting device. Re. 29,566, Cl. 350-97.000.

Dominion Auto Accessories Limited: *See*—
Brudy, Peter E., Re. 29,566, Cl. 350-97.000.

Ex-Cell-O Corporation: *See*—
Braun, Eric A., Re. 29,568, Cl. 156-580.200.

Ford, Eric H., to Lumenition, Ltd. Fuel injection systems for internal combustion engines. Re. 29,561, Cl. 123-32.0EA.

General Electric Company: *See*—
Swerdlow, Nathan, Re. 29,569, Cl. 307-17.000.

Halliburton Company: *See*—
Wray, Gary Q.; and Petty, George E., Re. 29,562, Cl. 166-.500.

Hawley, Royal T.; and Hollyer, Richard S., to Western Gear Corporation. Drill string heave compensator and latching apparatus. Re. 29,565, Cl. 254-172.000.

Hollyer, Richard S.: *See*—
Hawley, Royal T.; and Hollyer, Richard S., Re. 29,565, Cl. 254-172.000.

Larralde, Edward; and Robinson, Glen, to Vetco Offshore Industries, Inc. Hydraulic motion compensating apparatus. Re. 29,564, Cl. 254-172.000.

Lumenition, Ltd.: *See*—
Ford, Eric H., Re. 29,561, Cl. 123-32.0EA.

Manko, Howard H., to Alpha Metals, Inc. Functional alloy for use in automated soldering processes. Re. 29,563, Cl. 228-263.000.

Murton, Crawford B. Method of refining steel. Re. 29,567, Cl. 75-52.000.

Petty, George E.: *See*—
Wray, Gary Q.; and Petty, George E., Re. 29,562, Cl. 166-.500.

Robinson, Glen: *See*—
Larralde, Edward; and Robinson, Glen, Re. 29,564, Cl. 254-172.000.

Swerdlow, Nathan, to General Electric Company. Spare transformer connecting means. Re. 29,569, Cl. 307-17.000.

Tan, Sing Long: *See*—
Breimer, Hendrik; and Tan, Sing Long, Re. 29,570, Cl. 358-37.000.

U.S. Phillips Corporation: *See*—
Breimer, Hendrik; and Tan, Sing Long, Re. 29,570, Cl. 358-37.000.

Vetco Offshore Industries, Inc.: *See*—
Larralde, Edward; and Robinson, Glen, Re. 29,564, Cl. 254-172.000.

Western Gear Corporation: *See*—
Hawley, Royal T.; and Hollyer, Richard S., Re. 29,565, Cl. 254-172.000.

Wray, Gary Q.; and Petty, George E., to Halliburton Company. Method and apparatus for testing wells. Re. 29,562, Cl. 166-.500.

LIST OF PLANT PATENTEES

Duffett, William E.: *See*—
Jessel, Walter H., Jr.; and Duffett, William E., 4,218, Cl. 77.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,220, Cl. 74.000.

Hrebenink, Alexander, to Mikkelsens, Inc. Poinsettia plant. 4,219, 3-7-78, Cl. 86.000.

Hrebeniuk, Alexander, to Mikkelsens, Inc. Poinsettia plant. 4,221, 3-7-78, Cl. 86.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,218, 3-7-78, Cl. 77.000.

Jessel, Walter H., Jr.; and Duffett, William E., to Yoder Brothers, Inc. Chrysanthemum plant. 4,220, 3-7-78, Cl. 74.000.

Mikkelsens, Inc.: *See*—
Hrebenink, Alexander, 4,219, Cl. 86.000.
Hrebeniuk, Alexander, 4,221, Cl. 86.000.

Yoder Brothers, Inc.: *See*—
Jessel, Walter H., Jr.; and Duffett, William E., 4,218, Cl. 77.000.
Jessel, Walter H., Jr.; and Duffett, William E., 4,220, Cl. 74.000.

LIST OF DESIGN PATENTEES

Aluminum Company of America: *See*—
Watkins, Donald E.; and Johnson, Marshall B., 247,414, Cl. D7-99.000.

American Trading & Production Corporation: *See*—
Wagner, Harold O.; and Scherr, Samuel, 247,409, Cl. D7-39.000.
Wagner, Harold O.; and Scherr, Samuel, 247,410, Cl. D7-39.000.
Wagner, Harold O.; and Scherr, Samuel, 247,411, Cl. D7-39.000.

Ara-Bygg AB: *See*—
Hampf, Jan, 247,434, Cl. 14-52.000.

Asaki, James T., to International Telephone & Telegraph Corporation. Camera photoflash attachment. 247,439, 3-7-78, Cl. D16-42.000.

Berman, Bernard S.; Schlossberg, Bernard L.; and Kaye, Maurice. Foldable dishrack. 247,416, 3-7-78, Cl. D7-188.000.

Bloch, Jack, to Foster Grant Co., Inc. Spectacle front. 247,440, 3-7-78, Cl. D16-70.000.

Bonsack Baths Limited: *See*—
Bonsack, Horst Godfrey, 247,444, Cl. D23-49.000.

Bonsack, Horst Godfrey, to Bonsack Baths Limited. Combined bathtub and shower stall. 247,444, 3-7-78, Cl. D23-49.000.

Brio Toy AB: *See*—
Hagland-Ahrnborg, Kerstin Margaretha, 247,455, Cl. D34-15.0AG.

Brown, Richard G.: *See*—
Null, Philip L.; and Brown, Richard G., 247,398, Cl. D6-68.000.
Null, Philip L.; and Brown, Richard G., 247,405, Cl. D6-177.000.

Buckner, Carrol E., to Smoky Mountain Enterprises. Fireplace. 247,446, 3-7-78, Cl. D23-97.000.

Catterfeld, Robert G. Fish cleaning tool. 247,443, 3-7-78, Cl. D22-31.000.

Clabaugh, James E.: *See*—
Lammersen, William B., 247,407, Cl. D6-268.000.

Cohen, Maurice. Garment display rack. 247,401, 3-7-78, Cl. D6-147.000.

Cohen, Maurice. Garment display rack. 247,402, 3-7-78, Cl. D6-147.000.

Cooper, Ethel: *See*—
Kitay, Barry E., 247,452, Cl. D34-5.0CB.

Cooper, Maurice Jay: *See*—
Kitay, Barry E., 247,452, Cl. D34-5.0CB.

Cordell, Carl R., Jr. Combined packaging and storage tray for artificial fishing worms or the like. 247,425, 3-7-78, Cl. D9-188.000.

Dart Industries Inc.: *See*—
Montesi, Edward N., 247,412, Cl. D7-50.000.
Montesi, Edward N., 247,426, Cl. D9-242.000.

Driscoll, John J. Electrode holder. 247,421, 3-7-78, Cl. D8-30.000.

Dunlop Limited: *See*—
King, Stanley, 247,445, Cl. D25-80.000.
Mills, Anthony Mark, 247,431, Cl. D12-141.000.

F.D.B. Productions: *See*—
Fixler, Jon Scott, 247,433, Cl. D14-36.000.

Fagniart, Gaston, to Societe Anonyme dite: Boracier. Bag. 247,427, 3-7-78, Cl. D9-249.000.

Fixler, Jon Scott, to F.D.B. Productions. Headphone. 247,433, 3-7-78, Cl. D14-36.000.

Foster, Farrell T. Plant pot holder. 247,400, 3-7-78, Cl. D6-113.000.

Foster Grant Co., Inc.: *See*—
Bloch, Jack, 247,440, Cl. D16-70.000.

Hagland-Ahrnborg, Kerstin Margaretha, to Brio Toy AB. Toy rattle. 247,455, 3-7-78, Cl. D34-15.0AG.

Hamilton, Marshall. Holder for a bread toaster. 247,413, 3-7-78, Cl. D7-91.000.

Hampf, Jan, to Ara-Bygg AB. Staff locator. 247,434, 3-7-78, Cl. 14-52.000.

Hannon, Thomas. Face shield. 247,449, 3-7-78, Cl. D28-9.000.

Harper, J. William. Boot scraper for attachment to skiis. 247,415, 3-7-78, Cl. D7-182.000.

Harris, Lafayte. Table. 247,404, 3-7-78, Cl. D6-175.000.

Hiraishi, Ethuo; and Shohoji, Takeshi, to Ryobi Ltd. Fishing reel. 247,442, 3-7-78, Cl. D22-25.000.

Hooper, Craig H.: *See*—
Lammersen, William B., 247,407, Cl. D6-268.000.

Hooper, D. Kent: *See*—
Lammersen, William B., 247,407, Cl. D6-268.000.

International Telephone & Telegraph Corporation: *See*—
Asaki, James T., 247,439, Cl. D16-42.000.

Johansson, Hans Arne Valentin. Transporting device for bath- and toilet purposes. 247,458, 3-7-78, Cl. D24-64.000.

Johnson, Marshall B.: *See*—
Watkins, Donald E.; and Johnson, Marshall B., 247,414, Cl. D7-99.000.

Kaplan, Morris. Anti-theft guard for the ignition switch of a motor vehicle. 247,423, 3-7-78, Cl. D8-333.000.

Kaye, Maurice: *See*—
Berman, Bernard S.; Schlossberg, Bernard L.; and Kaye, Maurice, 247,416, Cl. D7-188.000.

King, Stanley, to Dunlop Limited. Floor tile. 247,445, 3-7-78, Cl. D25-80.000.

Kitay, Barry E., to Cooper, Maurice Jay; and Cooper, Ethel. Combined golf tool and range finder. 247,452, 3-7-78, Cl. D34-5.0CB.

Kitson, Gerald L. Egg ramp for life cycle poultry cage. 247,450, 3-7-78, Cl. D30-2.000.

Koelbel, William H.: *See*—
Stahl, Otto; and Koelbel, William H., 247,406, Cl. D6-193.000.

Kroll, Frederick H. Child's portable drawing, game and play box, or similar article. 247,441, 3-7-78, Cl. D19-36.000.

Lammersen, William B., to Clabaugh, James E.; Hooper, Craig H.; and Hooper, D. Kent. Bed sheet or the like. 247,407, 3-7-78, Cl. D6-268.000.

Levin, Monte L.: *See*—
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,435, Cl. D15-8.000.
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,436, Cl. D15-8.000.

Lighting Systems, Inc.: *See*—
Zelina, Thomas, 247,457, Cl. D48-24.00R.

Luedtke, Warren J., to S. C. Johnson & Son, Inc. Swirl bottle. 247,424, 3-7-78, Cl. D9-42.000.

Mick. David L. Log burning support. 247,418, 3-7-78, Cl. D7-207.000.

Mick, David L. Fireplace grate. 247,419, 3-7-78, Cl. D7-207.000.

Mills, Anthony Mark, to Dunlop Limited. Tire for a vehicle wheel. 247,431, 3-7-78, Cl. D12-141.000.

Montesi, Edward N., to Dart Industries Inc. Measuring spoon set. 247,412, 3-7-78, Cl. D7-50.000.

Montesi, Edward N., to Dart Industries Inc. Packaging tray for sausage or the like. 247,426, 3-7-78, Cl. D9-242.000.

Muller, Walter. Combined multiple cabinet and shelf storage unit. 247,403, 3-7-78, Cl. D6-164.000.

Nelson, James A., to Ryko Mfg., Co. Vehicle wash machine. 247,437, 3-7-78, Cl. D15-37.000.

Nelson, Norman, to Nelson Tool and Machine Company, Inc. Miniature candlestick for dollhouses and the like. 247,456, 3-7-78, Cl. D48-2.000.

Nelson Tool and Machine Company, Inc.: *See*—
Nelson, Norman, 247,456, Cl. D48-2.000.

Niccolls, Paul L. Poultry neck slitter guide. 247,438, 3-7-78, Cl. D15-121.000.

Null Manufacturing Corporation: *See*—
Null, Philip L.; and Brown, Richard G., 247,398, Cl. D6-68.000.
Null, Philip L.; and Brown, Richard G., 247,405, Cl. D6-177.000.

Null, Philip L.; and Brown, Richard G., to Null Manufacturing Corporation. Seat. 247,398, 3-7-78, Cl. D6-68.000.

Null, Philip L.; and Brown, Richard G., to Null Manufacturing Corporation. Table. 247,405, 3-7-78, Cl. D6-177.000.

Ragland, Larry L. Canopy bed frame. 247,399, 3-7-78, Cl. D6-83.000.

Rappoport, Seymour, to Ronson Corporation. Lighter. 247,448, 3-7-78, Cl. D27-42.000.

Recard, Richard Harrison. Game board. 247,453, 3-7-78, Cl. D34-5.0SS.

Reynolds, Clarke. Railroad brake pipe hanger. 247,420, 3-7-78, Cl. D8-373.000.

Ricaud, Julio. Ash tray. 247,447, 3-7-78, Cl. D27-14.000.

Ronson Corporation: *See*—
Rappoport, Seymour, 247,448, Cl. D27-42.000.

Russell, John C. Chemical container opener and dispenser. 247,422, 3-7-78, Cl. D8-33.000.

Ryko Mfg., Co.: *See*—
Nelson, James A., 247,437, Cl. D15-37.000.

Ryobi Ltd.: *See*—
Hiraishi, Ethuo; and Shohoji, Takeshi, 247,442, Cl. D22-25.000.

S. C. Johnson & Son, Inc.: *See*—
Luedtke, Warren J., 247,424, Cl. D9-42.000.

Salazar, Frankie A. Pool table. 247,454, 3-7-78, Cl. D34-3.000.

Sapier, Leslie Leonard, to Sapier, Maria. Combined golf tee indicator, ball cleaner and waste receptacle. 247,451, 3-7-78, Cl. D34-5.0QQ.

Sapier, Maria: *See*—
Sapier, Leslie Leonard, 247,451, Cl. D34-5.0QQ.

Scherr, Samuel: *See*—
Wagner, Harold O.; and Scherr, Samuel, 247,409, Cl. D7-39.000.
Wagner, Harold O.; and Scherr, Samuel, 247,410, Cl. D7-39.000.
Wagner, Harold O.; and Scherr, Samuel, 247,411, Cl. D7-39.000.

Schlerth, William A. Shoe or similar article. 247,396, 3-7-78, Cl. D2-282.000.

Schlossberg, Bernard L.: *See*—
Berman, Bernard S.; Schlossberg, Bernard L.; and Kaye, Maurice, 247,416, Cl. D7-188.000.

Scott, James E., to United States of America, Federal Communications Commission. Fine and coarse tuning assembly for cavities. 247,432, 3-7-78, Cl. D14-99.000.

Shohoji, Takeshi: *See*—
Hiraishi, Ethuo; and Shohoji, Takeshi, 247,442, Cl. D22-25.000.

Smith, Edward J. Fireplace grate. 247,417, 3-7-78, Cl. D7-207.000.

Smoky Mountain Enterprises: *See*—
Buckner, Carrol E., 247,446, Cl. D23-97.000.

Societe Anonyme dite: Boracier: *See*—
Fagniart, Gaston, 247,427, Cl. D9-249.000.

Stahl, Otto; and Koelbel, William H. Bench stanchion. 247,406, 3-7-78, Cl. D6-193.000.

Sykes, Sanford. Carrying case for a camera and accessories or the like. 247,460, 3-7-78, Cl. D87-5.00E.

Teal, James P. Combined tire bumper and air gauge. 247,429, 3-7-78, Cl. D10-86.000.

Teledyne Industries, Inc.: *See*—
Walker, Robert W.; and Walker, Dean M., 247,430, Cl. D12-88.000.

Tennison, J. C. Carrying case for circular saw blades. 247,459, 3-7-78, Cl. D87-1.00R.

Tomy Kogyo Co., Inc.: *See*—
Tsumita, Mitsuyo, 247,397, Cl. D6-7.000.

Tsumita, Mitsuyo, to Tomy Kogyo Co., Inc. Baby chair. 247,397, 3-7-78, Cl. D6-7.000.

Federal Communications Commission: *See*—
Scott, James E., 247,432, Cl. D14-99.000.

Ventura, Frank. Drinking vessel. 247,408, 3-7-78, Cl. D7-5.000.

Wagner, Harold O.; and Scherr, Samuel, to American Trading & Production Corporation. Handle for a tray or the like. 247,409, 3-7-78, Cl. D7-39.000.

Wagner, Harold O.; and Scherr, Samuel, to American Trading & Production Corporation. Handle for a casserole or the like. 247,410, 3-7-78, Cl. D7-39.000.

Wagner, Harold O.; and Scherr, Samuel, to American Trading & Production Corporation. Handle for a hostess tray or the like. 247,411, 3-7-78, Cl. D7-39.000.

Walker, Dean M.: *See*—
Walker, Robert W.; and Walker, Dean M., 247,430, Cl. D12-88.000.

Walker, Robert W.; and Walker, Dean M., to Teledyne Industries, Inc. Vehicle. 247,430, 3-7-78, Cl. D12-88.000.

Watkins, Donald E.; and Johnson, Marshall B., to Aluminum Company of America. Dispensing apparatus for comestibles or similar article. 247,414, 3-7-78, Cl. D7-99.000.

Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., to Willinger Bros., Inc. Aquarium air pump. 247,435, 3-7-78, Cl. D15-8.000.

Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., to Willinger Bros., Inc. Aquarium air pump. 247,436, 3-7-78, Cl. D15-8.000.

Willinger Bros., Inc.: *See*—
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,435, Cl. D15-8.000.
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,436, Cl. D15-8.000.

Willinger, Harding W.: *See*—
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,435, Cl. D15-8.000.
Willinger, Allan H.; Willinger, Harding W.; and Levin, Monte L., 247,436, Cl. D15-8.000.

Wood, John L. Level. 247,428, 3-7-78, Cl. D10-82.000.

Zelina, Thomas, to Lighting Systems, Inc. Portable light. 247,457, 3-7-78, Cl. D48-24.00R.

CLASSIFICATION OF PATENTS

ISSUED MARCH 7, 1978

NOTE.—First number, class; second number, subclass; third number, patent number

CLASS 2

2.1 R 4,077,064
93 4,077,065
129 4,077,066
234 4,077,067
428 4,077,068

CLASS 3

1 4,077,069
1.912 4,077,070
13 4,077,071

CLASS 4

149 4,077,072

CLASS 5

81 R 4,077,073
370 4,077,074

CLASS 6

10 4,077,075

CLASS 8

18 A 4,077,764
41 B 4,077,765
44 4,077,766
85 R 4,077,767
107 4,077,768
137 4,077,769
142 4,077,770
196 4,077,771

CLASS 9

8.3 E 4,077,076
310 A 4,077,077

CLASS 11

1 AD 4,077,078

CLASS 15

104.06 R 4,077,079
4,077,080
181 4,077,081
230.11 4,077,082
244 R 4,077,083
306 A 4,077,084

CLASS 16

2 4,077,085
33 4,077,086
35 R 4,077,087
47 4,077,088

CLASS 17

1 G 4,077,089
41 4,077,090

CLASS 23

230 B 4,077,772
232 R 4,077,773
4,077,774
254 E 4,077,775
254 R 4,077,776
288 R 4,077,777

CLASS 24

77 R 4,077,091
81 CC 4,077,092
130 4,077,093
134 R 4,077,094
204 4,077,095

CLASS 27

2 4,077,096

CLASS 28

281 4,077,097

CLASS 29

33 T 4,077,098
38 C 4,077,099
157 R 4,077,100
240.5 4,077,101
252 4,077,102
259 4,077,103
271 4,077,104
278 4,077,105
400 R 4,077,107
403 4,077,108
420 4,077,109
458 4,077,110
571 4,077,111
580 4,077,112
600 4,077,113
622 4,077,114
630 B 4,077,115
727 4,077,116
739 4,077,117
748 4,077,118
792 4,077,106

CLASS 30

41 4,077,119
43.5 4,077,120
120.3 4,077,121
133 4,077,122
286 4,077,123
287 4,077,124
382 4,077,125

CLASS 32

14 A 4,077,126

CLASS 33

85 4,077,127
138 4,077,128
147 T 4,077,129
174 L 4,077,130
356 4,077,131
366 4,077,132

CLASS 34

17 4,077,133
22 4,077,134
57 R 4,077,135
62 4,077,136
70 4,077,137

CLASS 35

11 R 4,077,138

CLASS 37

41 4,077,139
103 4,077,140
117.5 4,077,141
141 R 4,077,142

CLASS 38

77.83 4,077,143

CLASS 40

564 4,077,146
590 4,077,144
4,077,145

CLASS 42

1 L 4,077,147

CLASS 43

16 4,077,148
19.2 4,077,149
23 4,077,150
43.12 4,077,151

CLASS 46

12 4,077,152
24 4,077,153
26 4,077,154
74 R 4,077,155
206 4,077,156

CLASS 47

58 4,077,157
59 4,077,158
66 4,077,159

CLASS 48

202 4,077,778

CLASS 49

421 4,077,160

CLASS 51

98 R 4,077,161
163.1 4,077,162
165.77 4,077,163
206 P 4,077,164
386 4,077,165
420 4,077,166

CLASS 52

79.1 4,077,170
96 4,077,171
106 4,077,167
111 4,077,172
169.8 4,077,173
259 4,077,174
263 4,077,175
622 4,077,168
693 4,077,176
741 4,077,169
4,077,177

CLASS 53

15 4,077,178
28 4,077,186
32 4,077,179
37 4,077,180
78 4,077,181
109 4,077,182
111 R 4,077,183
112 A 4,077,184
123 4,077,185
131 4,077,187
310 4,077,188

CLASS 55

25 4,077,779
26 4,077,780
96 4,077,781
139 4,077,782
146 4,077,783
4,077,784
155 4,077,785
185 4,077,786
419 4,077,787

CLASS 56

11.9 4,077,189
12.7 4,077,190
4,077,191
16.4 4,077,192
328 R 4,077,193
4,077,194

CLASS 57

58.89 4,077,195
58.95 4,077,196
156 4,077,197

CLASS 58

1 R 4,077,198
23 BA 4,077,199
50 R 4,077,200
140 R 4,077,201

CLASS 60

39.14 4,077,202
39.27 4,077,203
39.28 R 4,077,204
39.32 4,077,205
262 4,077,206
276 4,077,207
277 4,077,208
282 4,077,209
4,077,210
428 4,077,211
431 4,077,212
500 4,077,213
512 4,077,214
517 4,077,215
520 4,077,216
535 4,077,217
592 4,077,218
599 4,077,219
641 4,077,220
650 4,077,221

CLASS 61

3 4,077,222
45 D 4,077,223
94 4,077,224
103 4,077,225

CLASS 62

48 4,077,788
54 4,077,789
63 4,077,226
74 4,077,227
256 4,077,228
283 4,077,229
401 4,077,230
514 R 4,077,231

CLASS 63

31 4,077,237

CLASS 64

11 R 4,077,232
4,077,233
17 A 4,077,235
17 R 4,077,234
22 4,077,236

CLASS 65

11 R 4,077,790
273 4,077,791
288 4,077,792

CLASS 66

50 B 4,077,238

CLASS 68

53 4,077,239

CLASS 70

360 4,077,240
371 4,077,241
413 4,077,242
459 4,077,243

CLASS 71

7 4,077,793
31 4,077,794
78 4,077,795
4,077,796
92 4,077,797
100 4,077,798

CLASS 72

129 4,077,244
250 4,077,245
325 4,077,247
328 4,077,246
389 4,077,248
4,077,249

CLASS 73

49.8 4,077,250
59 4,077,251
4,077,252
94 4,077,254
117 4,077,255
145 4,077,256
300 4,077,257
302 4,077,258
343 R 4,077,259
356 4,077,260
421 B 4,077,263
425.4 R 4,077,264
445 4,077,265
517 A 4,077,266
629 4,077,253
701 4,077,262
706 4,077,261

CLASS 74

25 4,077,267
60 4,077,269
89.15 4,077,268
230.24 4,077,271
230.4 4,077,270
242.1 FF 4,077,272
415 4,077,273
425 4,077,274
473 R 4,077,275
475 4,077,276
501 P 4,077,277
682 4,077,278
711 4,077,279
760 4,077,280
4,077,281
4,077,282
860 4,077,283

CLASS 75

52 Re.29,567
71 4,077,799
108 4,077,800
122 4,077,801

CLASS 81

7 4,077,284

CLASS 82

1 C 4,077,285
2 D 4,077,286

CLASS 83

92 4,077,287
146 4,077,288
152 4,077,289
471.2 4,077,290
499 4,077,291
745 4,077,292

CLASS 84

1.01 4,077,293
1.23 4,077,294
304 4,077,295
312 P 4,077,296
411 R 4,077,297
454 4,077,298

CLASS 85

1 P 4,077,299
80 4,077,300

CLASS 90

13.2 4,077,301
13.9 4,077,302

CLASS 91

50 4,077,303
276 4,077,304
486 4,077,305

CLASS 93

8 R 4,077,306
18 4,077,307
19 4,077,308
27 4,077,309

CLASS 96

1 R 4,077,802
1 SD 4,077,804
1.1 4,077,803
115 P 4,077,805
115 R 4,077,806

CLASS 98

40 D 4,077,310

CLASS 99

355 4,077,311
471 4,077,312

CLASS 100

2 4,077,313
26 4,077,314
88 4,077,315
163 R 4,077,316

CLASS 101

37 4,077,317
4,077,318
41 4,077,319
93.05 4,077,336
119 4,077,320
128.1 4,077,321
129 4,077,322
407 R 4,077,323
450 4,077,324
467 4,077,325

CLASS 102

67 4,077,326

CLASS 104

35 4,077,327

CLASS 105

261 A 4,077,328
377 4,077,329
410 4,077,330
463 4,077,331
477 4,077,332

CLASS 106

24 4,077,807
40 R 4,077,808
88 4,077,809

CLASS 108

6 4,077,333
56.1 4,077,334
75 4,077,335

CLASS 110

235 4,077,337
4,077,338

CLASS 112

121.27 4,077,339
131 4,077,340
158 B 4,077,341
292 4,077,342
410 4,077,343

CLASS 113

115 4,077,344

CLASS 114

39 4,077,345
74 A 4,077,346
108 4,077,347
200 4,077,348
230 4,077,349
260 4,077,350

CLASS 115

27 4,077,351
35 4,077,352
41 R 4,077,353

CLASS 118

12 4,077,354
219 4,077,355
301 4,077,356
321 4,077,357
658 4,077,358

CLASS 119

16 4,077,359
51.12 4,077,360
52 R 4,077,361

CLASS 122

491 4,077,362

CLASS 123

23 4,077,367
32 EA Re.29,561
32 EH 4,077,364
32 SP 4,077,363
32 ST 4,077,368
43 R 4,077,365
90.16 4,077,369
103 B 4,077,370
106 4,077,371
117 A 4,077,373
117 D 4,077,372
119 E 4,077,374
122 AB 4,077,375
139 DP 4,077,376
148 E 4,077,380
148 P 4,077,378
148 S 4,077,377
4,077,379
179 G 4,077,381
190 A 4,077,382
198 E 4,077,383
203 4,077,366

CLASS 124

1 4,077,384
24 R 4,077,385
78 4,077,386

CLASS 126

8 4,077,387
121 4,077,388
190 4,077,389
263 4,077,390
270 4,077,391
271 4,077,392
4,077,393

CLASS 128

1 D 4,077,394
2 F 4,077,395
4,077,396
2.06 E 4,077,397
4,077,398
23 4,077,399
24 A 4,077,401
24 R 4,077,400
4,077,402
75 4,077,403
145.8 4,077,404
214 F 4,077,405
217 4,077,406
260 4,077,407
285 4,077,408
4,077,409
287 4,077,410
303 R 4,077,411
347 4,077,412
419 D 4,077,413

CLASS 131

8 R 4,077,414
76 4,077,415

CLASS 134

159 4,077,416

CLASS 135

3 R 4,077,417
4 R 4,077,418
5 AT 4,077,419
25 R 4,077,420
4,077,421

CLASS 137

68 A 4,077,423
68 R 4,077,422
119 4,077,424
219 4,077,425
454.6 4,077,426
551 4,077,427
567 4,077,428
588 4,077,429
593 4,077,430
596.14 4,077,431
601 4,077,432
614.04 4,077,433

CLASS 138

92 4,077,434
93 4,077,435

CLASS 139

34 4,077,436
116 4,077,437
302 4,077,438

CLASS 140

1 4,077,439
105 4,077,440

CLASS 141

1 4,077,441
20 4,077,442
111 4,077,443
130 4,077,444

CLASS 144

3 D 4,077,445
34 E 4,077,446
4,077,447
118 4,077,448
144 A 4,077,449
172 4,077,450

CLASS 148

2 4,077,810
11.5 F 4,077,811
12.4 4,077,812
12.7 A 4,077,813
13.2 4,077,814
23 4,077,815
126 4,077,816
171 4,077,817
174 4,077,818
188 4,077,819

CLASS 149

109.4 4,077,820

CLASS 150

31 4,077,451

CLASS 152

327 4,077,452
330 L 4,077,453
354 R 4,077,454
427 4,077,456

CLASS 156

79 4,077,821
157 4,077,822
212 4,077,823
244.18 4,077,825
244.24 4,077,824
249 4,077,830
350 4,077,826
352 4,077,827
429 4,077,828
446 4,077,829
563 4,077,831
580.2 Re.29,568
624 4,077,832

CLASS 159

47 R 4,077,841

CLASS 162

176 4,077,833
257 4,077,834

CLASS 164

4 4,077,457
11 4,077,458
40 4,077,459
152 4,077,460
194 4,077,461
429 4,077,462

CLASS 165

1 4,077,463
18 4,077,464
84 4,077,465
89 4,077,466
105 4,077,467
159 4,077,468

CLASS 166

.5 Re.29,562
59 4,077,469
244 R 4,077,470
275 4,077,471
315 4,077,472
323 4,077,473

CLASS 169

48 4,077,474

CLASS 172

3 4,077,475
49 4,077,476
114 4,077,477
267 4,077,478
730 4,077,479

CLASS 173

22 4,077,480

CLASS 174

15 BH 4,078,150
15 R 4,078,149

CLASS 175

232 4,077,481
340 4,077,482

CLASS 176

18 4,077,835
22 4,077,836
38 4,077,837
68 4,077,838
76 4,077,843
78 4,077,839
87 4,077,840

CLASS 178

18 4,078,151
22 4,078,152
68 4,078,159
69.1 4,078,153

CLASS 179

1 CN 4,078,155
1 SB 4,078,154
15 BL 4,078,156
16 EA 4,078,157
27 D 4,078,158
110 A 4,078,160

CLASS 180

6.5 4,077,483
44 M 4,077,484
68.5 4,077,485
79.1 4,077,486
82 R 4,077,487
98 4,077,488
124 4,077,489
143 4,077,490

CLASS 181

290 4,077,491

CLASS 184

64 4,077,492
105 A 4,077,493
4,077,494

CLASS 188

1 C 4,077,495
33 4,077,496
65.1 4,077,497
72.2 4,077,498
72.4 4,077,499
106 P 4,077,500
218 XL 4,077,501

CLASS 192

4 B 4,077,502
18 R 4,077,503
98 4,077,504

CLASS 195

63 4,077,842
80 R 4,077,844
103.5 K 4,077,845
139 4,077,846

CLASS 197

1 R 4,077,505

CLASS 198

367 4,077,506
619 4,077,507
666 4,077,508
747 4,077,509
840 4,077,510

CLASS 200

19 R 4,078,161
48 A 4,078,162

CLASS 201

21 4,077,847
41 4,077,848

CLASS 202

205 4,077,849

CLASS 203

29 4,077,850

CLASS 204

15 4,077,851
4,077,852
20 4,077,853
37 R 4,077,854
49 4,077,855
149 4,077,856
158 R 4,077,857
159.23 4,077,858
4,077,859
159.24 4,077,860
195 P 4,077,861
262 4,077,862
268 4,077,863
285 4,077,864
297 W 4,077,865

CLASS 206

.5 4,077,511
45.2 4,077,512
106 4,077,513
315 B 4,077,514
456 4,077,515
577 4,077,517
583 4,077,518
602 4,077,516

CLASS 208

9 4,077,866
10 4,077,867
4,077,868
127 4,077,869
128 4,077,870

CLASS 209

4 4,077,871
5 4,077,874
74 R 4,077,519
214 4,077,872
332 4,077,873

CLASS 210

17 4,077,877
23 F 4,077,875
59 4,077,878
62 4,077,879
65 4,077,880
83 4,077,881
90 4,077,882
136 4,077,876
4,077,883
172 4,077,884
193 4,077,885
198 C 4,077,886
331 4,077,887

CLASS 211

55 4,077,520
69.1 4,077,521
175 4,077,522

CLASS 214

1 BD 4,077,523
2.5 4,077,525
8.5 A 4,077,524
17 B 4,077,527
17 D 4,077,526
18 R 4,077,528
145 R 4,077,529
152 4,077,530
309 4,077,531
310 4,077,532
356 4,077,533
396 4,077,534
515 4,077,535

CLASS 215

228 4,077,536
253 4,077,537

CLASS 219

69 C 4,078,163
121 L 4,078,165
121 LM 4,078,164
121 R 4,078,167
216 4,078,166
497 4,078,168

CLASS 220

268 4,077,538

CLASS 221

237 4,077,539
297 4,077,540

CLASS 222

1 4,077,541
70 4,077,542
95 4,077,543
4,077,544
144.5 4,077,545
179 4,077,546
207 4,077,547
321 4,077,548
4,077,549
327 4,077,550
494 4,077,551
600 4,077,552

CLASS 224

42.1 G 4,077,553
42.46 R 4,077,554

CLASS 225

103 4,077,555

CLASS 227

8 4,077,556
83 4,077,557

CLASS 228

121 4,077,558
154 4,077,559
220 4,077,560
263 Re.29,563

CLASS 229

42 4,077,561
62 4,077,562

CLASS 232

43.2 4,077,563

CLASS 233

20 A 4,077,564

CLASS 235

312 4,077,565

CLASS 236

46 C 4,077,566
49 4,077,567

CLASS 237

8 D 4,077,568

CLASS 239

101 4,077,569
107 4,077,570
4,077,571
265.17 4,077,572

CLASS 241

32 4,077,573
52 4,077,574
285 A 4,077,575

CLASS 242

3 4,077,576
7.22 4,077,577
18 G 4,077,578
57.1 4,077,579
58.2 4,077,580
67.3 R 4,077,581
85.1 4,077,583
107.4 A 4,077,584
107.4 B 4,077,585
129.5 4,077,586
215 4,077,587
219 4,077,582

CLASS 244

31 4,077,588
100 A 4,077,589
118 R 4,077,590

CLASS 246

415 A 4,077,591

CLASS 248

59 4,077,592
146 4,077,593
188.7 4,077,594
210 4,077,595
379 4,077,596
477 4,077,597

CLASS 249

19 4,077,598
177 4,077,599
204 4,077,600

CLASS 250

201 4,078,171
4,078,172
237 G 4,078,173
270 4,078,174
277 CH 4,078,175
296 4,078,176
323 4,078,177
336 4,078,178
338 4,078,179
358 R 4,078,180
495 4,078,181
543 4,077,888
4,077,889

CLASS 251

9 4,077,601
25 4,077,602
122 4,077,606
205 4,077,603
329 4,077,604
335 A 4,077,605

CLASS 252

8.8 4,077,890
4,077,891
49.9 4,077,892
56 R 4,077,893
76 4,077,894
4,077,895
90 4,077,896
99 4,077,897
106 4,077,898
181.4 4,077,899
299 4,077,900
301.1 W 4,077,901
400 A 4,077,902
429 A 4,077,905
429 C 4,077,903
429 R 4,077,904
431 C 4,077,906
439 4,077,907
455 R 4,077,908
455 Z 4,077,909
4,077,910
461 4,077,912
462 4,077,913
518 4,077,914
521 4,077,915
522 4,077,916
545 4,077,917
550 4,077,911

CLASS 254

88 4,077,607
93 H 4,077,608
134.3 FT 4,077,609
134.4 4,077,610
172 Re.29,564
Re.29,565

CLASS 256

10 4,077,611

CLASS 260

2.1 E 4,077,918
2.3 4,077,923
2.5 AC 4,077,919
2.5 AM 4,077,920
2.5 B 4,077,921
2.5 N 4,077,922
3 4,077,924
22 CB 4,077,925
23.7 N 4,077,927
28.5 AS 4,077,928
29.6 AQ 4,077,929
29.6 NR 4,077,931
29.6 TA 4,077,926
4,077,930
4,077,932
29.7 EM 4,077,933
30.6 R 4,077,934
31.8 R 4,077,935
33.8 R 4,077,936
37 SB 4,077,937
4,077,938
40 R 4,077,939
45.7 P 4,077,940
45.75 N 4,077,941
45.85 S 4,077,942
46.5 UA 4,077,943
75 M 4,077,945
75 R 4,077,944
78 L 4,077,946
78 UA 4,077,947
79.5 R 4,077,948
112 R 4,077,950
112.5 R 4,077,949
4,077,951
112.5 S 4,077,952
149 4,077,953
250 BC 4,077,955
4,077,956
251.5 4,077,957
268 TR 4,077,958
279 R 4,077,959
281 NH 4,077,960
281 P 4,077,961
289 D 4,077,954
290 V 4,077,963
293.86 4,077,964
302 D 4,077,966
302 SD 4,077,965
306.7 C 4,077,967
4,077,969
4,077,970
306.8 R 4,077,968
308 B 4,077,971
314.5 4,077,972
4,077,973
4,077,974
319.1 4,077,975
326.1 4,077,977
4,077,978
326.2 4,077,976
326.85 4,077,981
332.1 4,077,979
332.2 A 4,077,980
340.7 4,077,982
340.9 AS 4,077,983
346.4 4,077,984
346.6 4,077,985
348.29 4,077,986
374 4,077,987
376 4,077,988
383 CN 4,077,962
404.5 4,077,989
4,077,990
407 4,077,991
410 4,077,992
448.2 E 4,077,994
448.8 R 4,077,993
449.6 M 4,077,995
464 4,077,996
502.4 P 4,077,997
518 R 4,077,998
566 AE 4,077,999
577 4,078,000
4,078,001
583 K 4,078,002
583 P 4,078,003
604 R 4,078,004
614 R 4,078,005
621 G 4,078,006
653.7 4,078,007
655 4,078,008
673 4,078,009
676 R 4,078,010
677 H 4,078,011
683 D 4,078,012
4,078,013
857 L 4,078,014
859 R 4,078,015
860 4,078,016
878 R 4,078,017
880 R 4,078,018
4,078,019
897 A 4,078,020
940 4,078,021
956 4,078,022
986 4,078,023

CLASS 261

39 B 4,078,024
41 D 4,078,025
87 4,078,026
116 4,078,027

CLASS 264

43 4,078,028
63 4,078,029
109 4,078,030
163 4,078,031
167 4,078,032
178 R 4,078,033
181 4,078,034
221 4,078,035
261 4,078,036
266 4,078,037
293 4,078,038

CLASS 266

159 4,077,614
201 4,077,615
281 4,077,616

CLASS 267

65 D 4,077,617
166 4,077,619

CLASS 269

130 4,077,618

CLASS 271

10 4,077,620
33 4,077,621
183 4,077,622

CLASS 272

61 4,077,623
76 4,077,624
116 4,077,625
128 4,077,626

CLASS 273

73 R 4,077,627
86 C 4,077,628
101 4,077,629
142 E 4,077,631
164 4,077,632
4,077,633
273 4,077,630

CLASS 274

23 R 4,077,635

CLASS 277

92 4,077,634
117 4,077,636
235 A 4,077,637

CLASS 280

21 R 4,077,638
28 4,077,639
42 4,077,640
4,077,641
43.18 4,077,643
43.2 4,077,642
47.34 4,077,644
204 4,077,645
4,077,646
211 4,077,647
236 4,077,648
420 4,077,649
423 R 4,077,650
426 4,077,651
610 4,077,652
620 4,077,653
718 4,077,654
756 4,077,655

CLASS 285

110 4,077,656
184 4,077,657

CLASS 292

307 R 4,077,658

CLASS 294

19 A 4,077,659
75 4,077,660
83 R 4,077,661

CLASS 296

23 G 4,077,662

CLASS 297

83 4,077,663
183 4,077,664
244 4,077,665
440 4,077,666
443 4,077,668
445 4,077,667
452 4,077,669

CLASS 299

11 4,077,670
17 4,077,671

CLASS 300

21 4,077,672

CLASS 303

22 A 4,077,676
24 F 4,077,673
40 4,077,674
95 4,077,675

CLASS 307

10 AT 4,078,182
17 Re.29,569
112 4,078,183
147 4,078,184

CLASS 308

3.6 4,077,677
8 4,077,679
10 4,077,678
70 4,077,680
72 4,077,681
160 4,077,682
235 4,077,683

CLASS 310

168 4,078,185
313 4,078,186
319 4,078,187

CLASS 312

220 4,077,684
246 4,077,685
257 SM 4,077,686

CLASS 313

222 4,078,188

CLASS 318

227 4,078,189
4,078,190
4,078,191
4,078,192
317 4,078,193
331 4,078,194
561 4,078,195
562 4,078,196
626 4,078,197
627 4,078,198

CLASS 323

1 4,078,199
9 4,078,200

CLASS 324

61 R 4,078,202
71 CP 4,078,211
233 4,078,201

CLASS 325

421 4,078,212
459 4,078,213

CLASS 328

21 4,078,204
39 4,078,203

CLASS 330

107 4,078,205
253 4,078,206
273 4,078,207
296 4,078,208

CLASS 331

47 4,078,209
107 A 4,078,210

CLASS 333

7 D 4,078,214
70 R 4,078,215
76 4,078,216
97 S 4,078,217

CLASS 335

128 4,078,218
167 4,078,219
270 4,078,220

CLASS 337

168 4,078,221

CLASS 339

64 M 4,077,687
74 R 4,077,688
75 M 4,077,689
89 R 4,077,690
95 R 4,077,691
103 M 4,077,692
126 R 4,077,693
176 MF 4,077,695
176 MP 4,077,694
266 R 4,077,696
274 4,077,697
276 R 4,077,698

CLASS 340

6 R 4,078,222
7 R 4,078,223
52 H 4,078,224
146.1 AG 4,078,225
146.3 AG 4,078,227
146.3 SY 4,078,226
147 R 4,078,228
173 CM 4,078,229
259 4,078,231
347 AD 4,078,233
347 P 4,078,232

CLASS 343

9 4,078,234
4,078,235
228 4,078,236
700 MS 4,078,237

CLASS 346

75 4,078,238

CLASS 350

96.13 4,077,700
96.21 4,077,702
96.23 4,077,701
96.34 4,077,699
97 Re.29,566
145 4,077,703
218 4,077,704

CLASS 352

73 4,077,705

CLASS 353

1 4,077,706
27 R 4,077,707
4,077,708

CLASS 354

1 4,078,239
33 4,078,240
86 4,078,241
139 4,078,242

CLASS 355

3 R 4,077,710
3 TR 4,077,709
10 4,077,711
4,077,712
16 4,077,713
51 4,077,714
57 4,077,715
67 4,077,716
133 4,077,717

CLASS 356

4 4,077,718
75 4,077,719
118 4,077,720
124 4,077,721
127 4,077,722
163 4,077,723
208 4,077,724

CLASS 357

32 4,078,243
46 4,078,244

CLASS 358

37 Re.29,570
86 4,078,245

CLASS 360

133 4,078,246

CLASS 362

100 4,078,248
122 4,078,169
322 4,078,170

CLASS 363

96 4,078,247

CLASS 364

200 4,078,249
700 4,078,251
715 4,078,250
717 4,078,255
851 4,078,256
858 4,078,252
900 4,078,253
4,078,254
4,078,257
4,078,258
4,078,259
4,078,260

CLASS 365

8 4,078,230
189 4,078,261

CLASS 366

53 4,078,263
102 4,077,612
151 4,078,262
213 4,077,613

CLASS 401

17 4,077,725
209 4,077,726
215 4,077,727

CLASS 403

186 4,077,728
379 4,077,729
385 4,077,730

CLASS 404

83 4,077,731
87 4,077,732

CLASS 407

52 4,077,733
66 4,077,734
89 4,077,735

CLASS 408

16 4,077,736
206 4,077,737

CLASS 415

36 4,077,738
121 G 4,077,739

CLASS 416

228 4,077,741
230 4,077,740
245 A 4,077,742

CLASS 417

53 4,077,743
218 4,077,744
221 4,077,745
225 4,077,746
234 4,077,747
319 4,077,748
321 4,077,749
552 4,077,750

CLASS 418

270 4,077,751

CLASS 423

74 4,078,039
102 4,078,040
210 4,078,041
329 4,078,042
335 4,078,043
376 4,078,044
416 4,078,045
437 4,078,046
485 4,078,047
571 4,078,048

CLASS 424

1 4,078,049
35 4,078,051
36 4,078,052
52 4,078,053
60 4,078,054
76 4,078,050
4,078,055
117 4,078,056
212 4,078,057
228 4,078,058
242 4,078,059
4,078,060
4,078,061
246 4,078,062
250 4,078,063
251 4,078,064
261 4,078,065
266 4,078,066
272 4,078,067
4,078,068
4,078,069
273 R 4,078,070
4,078,071
275 4,078,072
278 4,078,073
279 4,078,074
281 4,078,075
283 4,078,076
4,078,078
285 4,078,077
301 4,078,079
304 4,078,080
305 4,078,081
317 4,078,082
4,078,083
4,078,090
324 4,078,084
325 4,078,085
326 4,078,086
329 4,078,087
331 4,078,088
349 4,078,089

CLASS 425

72 S 4,077,752
131.1 4,077,753
4,077,754
146 4,077,755
207 4,077,756
218 4,077,757
387.1 4,077,758
451 4,077,759
562 4,077,760

CLASS 426

545 4,078,091
584 4,078,092
593 4,078,093
641 4,078,094

CLASS 427

34 4,078,097
43 4,078,098
72 4,078,095
98 4,078,096
120 4,078,111
213 4,078,099
314 4,078,100
341 4,078,101
4,078,102
349 4,078,103
387 4,078,104
417 4,078,105
444 4,078,112

CLASS 428

35 4,078,106
38 4,078,107
62 4,078,109
93 4,078,110
196 4,078,113
379 4,078,114
395 4,078,115
431 4,078,116
446 4,078,117
480 4,078,108
521 4,078,118

CLASS 429

13 4,078,119
27 4,078,120
54 4,078,121
121 4,078,122
141 4,078,123
144 4,078,124
145 4,078,125
166 4,078,126
206 4,078,127

CLASS 431

8 4,077,761
45 4,077,762

CLASS 432

14 4,077,763

CLASS 526

10 4,078,128
11 4,078,129
17 4,078,130
20 4,078,131
76 4,078,132
80 4,078,133
204 4,078,134
209 4,078,135
331 4,078,136

CLASS 536

8 4,078,137
10 4,078,138
17 4,078,139
84 4,078,140

CLASS 544

152 4,078,141

CLASS 560

19 4,078,142
78 4,078,143
126 4,078,144
4,078,145
160 4,078,146
180 4,078,147
185 4,078,148

CLASSIFICATION OF DESIGNS

D2— 282 247,396
D6— 7 247,397
68 247,398
83 247,399
113 247,400
147 247,401
247,402
164 247,403
175 247,404
177 247,405
193 247,406
268 247,407
D7— 5 247,408
39 247,409
247,410
247,411
50 247,412
91 247,413
99 247,414
182 247,415
188 247,416
207 247,417
247,418
247,419
D8— 30 247,421
33 247,422
333 247,423
373 247,420
D9— 42 247,424
188 247,425
242 247,426
249 247,427
14— 52 247,434
D10— 82 247,428
86 247,429
D12— 88 247,430
141 247,431
D14— 36 247,433
99 247,432
D15— 8 247,435
247,436
37 247,437
121 247,438
D16— 42 247,439
70 247,440
D19— 36 247,441
D22— 25 247,442
31 247,443
D23— 49 247,444
97 247,446
D24— 64 247,458
D25— 80 247,445
D27— 14 247,447
42 247,448
D28— 9 247,449
D30— 2 247,450
D34— 3 247,454
5 CB 247,452
5 QQ 247,451
5 SS 247,453
15 AG 247,455
D48— 2 247,456
24 R 247,457
D87— 1 R 247,459
5 E 247,460

CLASSIFICATION OF PLANTS

P.— 74 4,220
77 4,218
86 4,219
4,221

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

260— 2.5 BB T968,002
23 EP T968,001

GEOGRAPHICAL INDEX
OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

1 : 4,077,497	4,077,424	4,078,071	4,077,707	4,077,142	4,078,162
4,077,577	4,077,427	4,078,079	4,077,760	4,077,144	4,078,168
4,077,626	4,077,430	4,078,091	4,077,862	4,077,145	4,078,178
4,077,921	4,077,436	4,078,103	4,077,876	4,077,175	4,078,196
4,077,957	4,077,463	4,078,110	4,077,905	4,077,180	4,078,239
4,078,156	4,077,468	4,078,144	4,077,922	4,077,188	18 : 4,077,094
4 : 4,077,110	4,077,480	4,078,157	4,077,930	4,077,198	4,077,118
4,077,176	4,077,481	4,078,159	4,077,993	4,077,248	4,077,264
4,077,323	4,077,483	4,078,170	4,078,000	4,077,283	4,077,329
4,077,570	4,077,485	4,078,173	4,078,021	4,077,302	4,077,419
4,077,571	4,077,486	4,078,179	4,078,058	4,077,313	4,077,512
4,077,783	4,077,489	4,078,192	4,078,119	4,077,331	4,077,553
4,077,896	4,077,515	4,078,209	4,078,167	4,077,342	4,077,600
4,078,261	4,077,533	4,078,214	10 : 4,077,184	4,077,354	4,077,687
5 : 4,077,928	4,077,541	4,078,215	4,077,399	4,077,365	4,077,756
4,078,117	4,077,542	4,078,217	4,077,429	4,077,397	4,077,762
6 : Re.29,564	4,077,567	4,078,224	4,077,954	4,077,398	4,077,909
4,077,068	4,077,604	4,078,227	4,078,014	4,077,404	4,077,959
4,077,069	4,077,607	4,078,229	4,078,022	4,077,410	4,078,002
4,077,086	4,077,631	4,078,230	11 : 4,078,186	4,077,422	4,078,089
4,077,100	4,077,632	4,078,237	12 : 4,077,119	4,077,445	4,078,248
4,077,103	4,077,633	4,078,245	4,077,197	4,077,447	19 : 4,077,134
4,077,106	4,077,646	4,078,250	4,077,247	4,077,460	4,077,157
4,077,126	4,077,654	4,078,252	4,077,256	4,077,484	4,077,280
4,077,143	4,077,656	4,078,257	4,077,267	4,077,500	4,077,281
4,077,148	4,077,657	4,078,260	4,077,301	4,077,517	4,077,282
4,077,150	4,077,665	4,078,263	4,077,311	4,077,523	4,077,315
4,077,151	4,077,666	8 : 4,077,104	4,077,540	4,077,537	4,077,446
4,077,152	4,077,668	4,077,237	4,077,593	4,077,539	4,077,490
4,077,160	4,077,671	4,077,296	4,077,658	4,077,543	4,077,651
4,077,161	4,077,692	4,077,417	4,077,731	4,077,561	4,077,655
4,077,165	4,077,727	4,077,558	4,077,749	4,077,583	4,078,259
4,077,177	4,077,742	4,077,569	4,077,878	4,077,629	20 : 4,077,312
4,077,190	4,077,770	4,077,601	4,078,211	4,077,634	21 : 4,077,179
4,077,200	4,077,774	4,077,808	13 : 4,077,095	4,077,649	4,077,229
4,077,226	4,077,782	4,078,171	4,077,122	4,077,664	4,077,412
4,077,231	4,077,807	4,078,172	4,077,194	4,077,703	4,077,596
4,077,236	4,077,813	9 : Re.29,570	4,077,299	4,077,717	4,077,754
4,077,246	4,077,826	4,077,128	4,077,328	4,077,739	4,077,891
4,077,269	4,077,847	4,077,163	4,077,343	4,077,746	4,078,012
4,077,270	4,077,854	4,077,181	4,077,531	4,077,751	4,078,013
4,077,276	4,077,857	4,077,203	4,077,721	4,077,772	4,078,041
4,077,297	4,077,861	4,077,205	4,077,914	4,077,802	22 : 4,077,196
4,077,339	4,077,864	4,077,396	14 : 4,077,383	4,077,806	4,077,213
4,077,345	4,077,868	4,077,513	15 : 4,077,242	4,077,833	4,077,234
4,077,347	4,077,870	4,077,547	17 : 4,077,083	4,077,842	4,077,243
4,077,370	4,077,873	4,077,548	4,077,087	4,077,846	4,077,525
4,077,390	4,077,879	4,077,549	4,077,090	4,078,015	4,077,777
4,077,394	4,077,882	4,077,557	4,077,096	4,078,105	4,077,867
4,077,403	4,077,883	4,077,572	4,077,116	4,078,124	4,077,869
4,077,407	4,077,940	4,077,681	4,077,123	4,078,142	24 : 4,077,074
4,077,411	4,078,044	4,077,683	4,077,137	4,078,145	4,077,291
4,077,418	4,078,046	4,077,690	4,077,141	4,078,160	4,077,307

4,077,441
4,077,595
4,077,637
4,077,678
4,077,917
4,077,935
4,078,118
25 : 4,077,220
4,077,274
4,077,284
4,077,308
4,077,393
4,077,467
4,077,488
4,077,565
4,077,718
4,077,722
4,077,759
4,077,803
4,078,048
4,078,053
4,078,114
4,078,194
4,078,241
4,078,249
26 : 4,077,120
4,077,155
4,077,159
4,077,162
4,077,178
4,077,215
4,077,239
4,077,279
4,077,330
4,077,332
4,077,366
4,077,372
4,077,426
4,077,506
4,077,534
4,077,554
4,077,582
4,077,608
4,077,611
4,077,639
4,077,738
4,077,821
4,077,844
4,077,845
4,077,872
4,077,894
4,077,895
4,077,901
4,077,991
4,078,020
4,078,036
4,078,084
4,078,097
4,078,100
4,078,104
27 : 4,077,076
4,077,227
4,077,434
4,077,493
4,077,494
4,077,650
4,077,877
4,077,898
4,078,050
28 : 4,077,073
4,077,127
4,077,479
29 : Re.29,568
4,077,193
4,077,259

4,077,401
4,077,518
4,077,627
4,077,697
31 : 4,077,433
4,077,667
32 : 4,077,574
33 : 4,077,875
4,078,221
4,078,222
34 : Re.29,563
4,077,065
4,077,132
4,077,228
4,077,462
4,077,516
4,077,546
4,077,560
4,077,586
4,077,606
4,077,612
4,077,669
4,077,693
4,077,701
4,077,719
4,077,725
4,077,726
4,077,778
4,077,785
4,077,786
4,077,789
4,077,796
4,077,801
4,077,822
4,077,851
4,077,852
4,077,858
4,077,859
4,077,866
4,077,874
4,077,881
4,077,890
4,077,892
4,077,904
4,077,906
4,077,910
4,077,927
4,077,933
4,077,944
4,077,949
4,077,958
4,077,967
4,077,979
4,077,980
4,077,983
4,077,985
4,077,990
4,078,004
4,078,007
4,078,009
4,078,016
4,078,019
4,078,027
4,078,049
4,078,054
4,078,056
4,078,062
4,078,066
4,078,067
4,078,068
4,078,080
4,078,099
4,078,188
4,078,207

4,078,212
4,078,234
4,078,247
4,078,255
4,078,256
35 : 4,078,226
36 : 4,077,066
4,077,101
4,077,109
4,077,168
4,077,169
4,077,263
4,077,304
4,077,324
4,077,325
4,077,338
4,077,360
4,077,406
4,077,408
4,077,409
4,077,503
4,077,519
4,077,521
4,077,550
4,077,555
4,077,562
4,077,579
4,077,581
4,077,623
4,077,628
4,077,635
4,077,643
4,077,659
4,077,663
4,077,677
4,077,685
4,077,689
4,077,700
4,077,706
4,077,709
4,077,710
4,077,715
4,077,728
4,077,750
4,077,780
4,077,804
4,077,815
4,077,823
4,077,830
4,077,850
4,077,853
4,077,860
4,077,916
4,077,932
4,077,934
4,077,941
4,077,950
4,077,982
4,077,998
4,078,052
4,078,098
4,078,102
4,078,106
4,078,112
4,078,130
4,078,141
4,078,152
4,078,165
4,078,218
4,078,219
4,078,238
4,078,254
37 : 4,077,097
4,077,271

4,077,288
4,077,319
4,077,391
4,077,392
4,078,143
4,078,163
38 : 4,077,478
4,077,605
39 : 4,077,081
4,077,082
4,077,102
4,077,107
4,077,164
4,077,254
4,077,268
4,077,273
4,077,349
4,077,369
4,077,382
4,077,455
4,077,491
4,077,511
4,077,594
4,077,636
4,077,686
4,077,737
4,077,768
4,077,788
4,077,790
4,077,791
4,077,792
4,077,811
4,077,816
4,077,824
4,077,897
4,077,907
4,077,912
4,077,924
4,077,942
4,077,947
4,077,948
4,077,995
4,078,001
4,078,031
4,078,032
4,078,060
4,078,061
4,078,113
4,078,115
4,078,128
4,078,180
4,078,184
4,078,197
40 : Re.29,562
4,077,171
4,078,042
41 : 4,077,386
4,077,388
4,078,233
42 : Re.29,567
Re.29,569
4,077,105
4,077,111
4,077,117
4,077,147
4,077,173
4,077,285
4,077,290
4,077,292
4,077,327
4,077,355
4,077,356
4,077,402
4,077,416

4,077,432
4,077,443
4,077,496
4,077,501
4,077,527
4,077,544
4,077,566
4,077,578
4,077,613
4,077,617
4,077,625
4,077,662
4,077,672
4,077,688
4,077,694
4,077,695
4,077,732
4,077,734
4,077,743
4,077,779
4,077,795
4,077,835
4,077,848
4,077,888
4,077,889
4,077,925
4,077,926
4,077,952
4,077,977
4,078,063
4,078,093
4,078,095
4,078,096
4,078,107
4,078,125
4,078,149
4,078,150
44 : 4,077,084
4,077,361
45 : 4,077,344
4,077,618
4,077,652
4,077,929
4,077,992
47 : 4,077,071
4,077,153
4,077,559
4,077,838
48 : 4,077,079
4,077,158
4,077,189
4,077,191
4,077,224
4,077,225
4,077,230
4,077,250
4,077,253
4,077,261
4,077,265
4,077,310
4,077,333
4,077,389
4,077,435
4,077,470
4,077,471
4,077,472
4,077,473
4,077,588
4,077,645
4,077,660
4,077,761
4,077,773
4,077,817
4,077,818

4,077,819
4,077,893
4,077,903
4,077,919
4,077,986
4,078,011
4,078,038
4,078,175
4,078,223
4,078,232
4,078,251
4,078,258
49 : 4,077,326
4,077,387
4,078,193
50 : 4,077,241
4,077,400
51 : 4,077,214
4,077,353
4,077,380
4,077,437
4,077,456
4,077,469
4,077,573
4,077,644
4,077,809
4,078,034
4,078,243
53 : Re.29,565
4,077,077
4,077,078
4,077,187
4,077,206
4,077,381
4,077,385
4,077,448
4,077,450
4,077,532
4,077,576
4,077,590
4,077,827
4,077,831
4,077,843
4,078,169
4,078,195
4,078,205
54 : 4,077,591
4,077,624
55 : 4,077,125
4,077,146
4,077,149
4,077,306
4,077,413
4,077,444
4,077,498
4,077,509
4,077,545
4,077,602
4,077,682
4,077,736
4,077,747
4,077,757
4,077,849
4,077,871
4,077,931
4,078,087
4,078,127
4,078,151
4,078,189
4,078,190
4,078,191
4,078,220
4,077,428
4,077,642

DESIGN PATENTS

4 : 247,399
247,429
5 : 247,425
6 : 247,404
247,408
247,415
247,420
247,452
247,454

247,460
8 : 247,407
247,417
247,430
9 : 247,456
12 : 247,401
247,402
247,422
13 : 247,432

17 : 247,423
247,449
19 : 247,400
247,418
247,419
247,437
24 : 247,453
25 : 247,440
26 : 247,443

247,450
29 : 247,438
34 : 247,396
247,406
247,448
36 : 247,416
247,435
247,436
247,441

37 : 247,398
247,405
247,446
39 : 247,409
247,410
247,411
247,414
247,439

42 : 247,421
247,433
247,457
44 : 247,412
247,426
47 : 247,413
48 : 247,459
55 : 247,424

PLANT PATENTS

42 : 4,219

4,221

54 : 4,218

4,220

DEFENSIVE PUBLICATIONS APPLICATIONS

[Notice of Dec. 16, 1969, 869 O.G. 6877]

34 : T968,001

47 : T968,002

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Juanita M. Kreps, Secretary
PATENT AND TRADEMARK OFFICE
Lutrelle F. Parker, Acting Commissioner